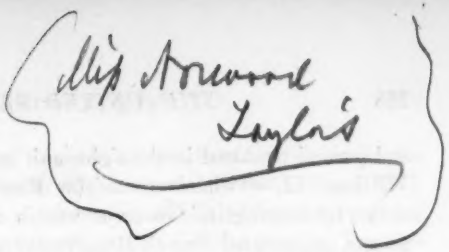

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GUSTAVUS ADOLPHUS.

"The 'foremost man' of all this modern world."—MAJ.-GEN. MITCHELL, B.A.

"*Anderson.* Behold, my lord, behold the sons of war,
Of triumph, turn to tears; while, from that eye,
All Sweden takes her fate—and smiles around,
Or weeps, with her Gustavus!
"*Arnoldus.* Wilt thou not cheer them? Say, thou great deliverer!
"*Sivard.* O general!
"1*st Dalecarlian.* King!
"2*d Dalecarlian.* Brother!
"3*d Dalecarlian.* Father!
"*All.* Friend!
"*Gustavus.* Come, come, my brothers all! Yes, I will strive
To be the sum of every title to ye,
And you shall be my sire, my friend revived,
My sister, mother, all that's kind and dear,
For so Gustavus holds ye—O, I will
Of private passions all my soul divest,
And take my dearer country to my breast;
To public good transfer each fond desire,
And clasp my Sweden with a lover's fire.
Well pleased, the weight of all her burdens bear;
Dispense all pleasure, but engross all care.
Still quick to find, to feel my people's woes,
And wake, that millions may enjoy repose."—BROOKE'S *Gustavus Vasa.*

THIS man, deservedly styled "The Great," and compared to a *Cube*, with the motto "*Æqualis semper et erectus*" (Harte, i. 104), from the proportions, equilibrium, and arrangement of his faculties, physical, moral, and mental, was born 9th December, 1594, at Stockholm.

Like Frederic the Great—in some respects the greatest monarch

and general produced in the eighteenth and nineteenth centuries—and William III.—"who honored" (as Englishmen admit) "the British crown by wearing it," Gustavus was in a measure the pupil of Huguenot (expatriated French Protestants) principles and abilities, especially for war; since his preceptor Jacob de la Gardies must have been "Reformed," or else the first generations of that great race in Sweden could scarcely have experienced a kind reception and constant employment from two sons of Gustavus Vasa, Eric and Charles, the latter most like his father, and have continued to exercise influence and to enjoy command under the latter, when Charles IX.

Himself "the 'foremost man' of all this modern world," one who passed through life "without ever being dismayed or embarrassed, from the seventeenth year of his age to the hour of his death," was the son of a monarch whose character was in everything the reverse of his more illustrious descendant. This has been summed up most admirably by his successor, Gustavus III., "great as king, bad as citizen, excellent as a statesman; stern, severe, tyrannical, but anxious for the honor, the independence of the kingdom; a dangerous rival, but still more dangerous as a subject; the only one of his brothers and sisters who would have been like his father (Gustavus Vasa, the Washington of Sweden), provided fate had permitted him to be born to a crown, and had saved him from obtaining it by crime. He had left his kingdom (to Gustavus) at war; first with Poland, which was more intent upon the acquisition of Liefland (Livonia) than upon replacing Sigismund on the throne of Sweden, which he had lost; second, with Denmark, which thought the time opportune to avail herself of Sweden's intestine discord for the extension of her own boundaries; third, with part of Russia, which, united with Sigismund, intended to hurl Sweden's greatest ally, Vasili Schuski, from a throne (the Russian) to which the son of Sigismund aspired, on which an impostor (Demetrius) had seated himself, but which, after the fall of Schuski, seemed to be destined for a prince of the House of Vasa" (Duke Charles Philip, elected Grand Duke of Muscovy at the death of Charles IX., 1611). In one respect, however, Charles IX. was most remarkable: he seemed to have foreseen the terrible consequences which were shortly to ensue from the religious divisions in Europe, and to have appreciated the influence that his son would exert upon the struggle, whose magnitude he recognized with the eye of a veritable prophet. "*Ille faciet*," "He will accomplish it," was his constant exclamation. That the progress of humanity was not arrested by a return of the "dark ages" is due to Gustavus Adolphus. To him and to Maurice of Nassau are attributable the bases of the art and science of war as applied to all subsequent time, down to the present. Gustavus Adolphus never was at peace. He was born, so to speak, was bred, and lived and died in his harness. Indeed, to apply the words of Scripture, "Nicanor (a word derivative from *Nike*, vic-

tory) lay dead in his harness" in that supreme battle which broke the charm of the mightiest champion of the imperial power (Graham, 121), Wallenstein, vanquished its best troops, assembled by the magic of his name, and witnessed the fall of its most devoted paladin, Pappenheim.

It would be in vain to attempt to develop in one article all that Gustavus Adolphus did effect. The army which he had made in his campaigns against the Danes, the Russians, and the Poles, was the first army, such as modern experts understand it, which ever appeared upon a European field of battle; but to confine his glories to mere military achievements would be a wicked misjudgment of this illustrious Swede. He was equally remarkable as a great king, a great captain, and as a great man, as a sovereign, an administrator, political economist, lawmaker, diplomatist, in fact, in every line, which, beginning in the individual, centres in the chief of the state and the leader of its military forces. Moreover, with the exception of the defect of short-sightedness (common to Frederic the Great, Napoleon, and a number of distinguished generals who, notwithstanding, saw most clearly upon the checker-board of war), his vast ability was the tenant of a commensurate tabernacle of flesh, so majestic, and so well calculated to act, to bear, and to suffer, that without being gross, it required a mighty charger to carry this great Swedish king.

His first independent command was on the 24th April, 1611, when he was not yet seventeen years old, eight months before he assumed the crown as elected king and hereditary prince of the Swedes, Goths, and Vandals, on the 26th December, 1611. In many respects he was the first legitimate king of Sweden whose rights were acknowledged. The history of Sweden may be said to commence with Gustavus Vasa, in 1523. This liberator was succeeded by his son, Eric XIV., who was deposed and replaced by his brother, John III. John transmitted his crown to his son Sigismund, King of Poland, who, in 1604, was likewise deposed, and his uncle, another son of Gustavus Vasa, known as Charles IX., obtained possession of the throne. All these numbers, XIV., III., and IX., are apocryphal. Gustavus Adolphus was the first legitimate king by the grace of God, birth; by the will of the people, selection. As in the case of the greatest of the Greeks, Epaminondas, whose career embraced but sixteen years,—a single reign of twenty-one years, and a single man, sufficed to elevate Sweden like Thebes, from comparative obscurity into an arbiter of events. Again, like Epaminondas, the Swedish monarch was killed upon the victorious scene of his fame, but the parallel ends here: Thebes fell prone again with her hero; Gustavus left behind him a succession of heroes, through whom and their pupils Sweden retained a very great influence upon European affairs, which lasted for nearly a century. This continued until Charles XII. broke the "magical sword" which Gustavus had forged, in the

same manner as Napoleon, by an invasion of Russia, in 1707, which culminated at Pultowa, 8th July, 1709.

To Gustavus Adolphus is due the credit of the first real national army; of the first digested articles of war; of a thorough reformation of infantry, cavalry, and artillery; of the commencement of line tactics; of the practical formation of infantry (he was the greatest infantry officer known to history); of its posting by brigade; of the mobilization of artillery and its use by battery; of cartridges; of canister or grape-shot; of the recognition of the shock as the important point for cavalry; of the rudiments of a general staff; of scientific engineering as applied to field-works; of the general introduction of uniforms; of field surgery (he had three surgeons to each regiment); and a hundred ameliorations which were patent at the time, but lost sight of in the subsequent improvements, which in some respects culminated under Frederic the Great, but in others are still occurring.

The first campaigns of Gustavus were against the Danes, in those southern provinces of the Scandinavian peninsula which Charles X., Gustavus, wrested, on 26th February, 1658, from Denmark, by the peace of Roskilde, so that the whole Swedish peninsula thenceforward owed obedience to one crown.

His next wars were against the Poles, and, through his generals, against the Russians, whose results rendered the Baltic Sea almost a Swedish lake. The battle of Wallhoff, fought 7th January, 1626, against the Poles and Lithuanians, under the "Old" Sapieha, is remarkable for the first display of the efficiency of the new Swedish infantry tactics against cavalry, in a country and on a field particularly favorable to the latter (mounted) arm. From what is known of it, it would seem to be a type of the vaunted battle of the Pyramids, in which the French foot broke the power of the Mamelukes, the finest horsemen in the world; of that less-known battle of Fleurus, in which the Dutch infantry, with the improved fire-arms and bayonets, introduced by their general, the distinguished engineer Coehorn, actually scoffed at the furious efforts of the magnificent French Household cavalry, launched against them by the consummate Luxembourg.

In 1629 (the year of the colonization of New Hampshire), the whirlpool of the Thirty Years' War involved Sweden, and the application of the German Protestant brought Gustavus into Middle Europe in defense of evangelical religion.

Imagine the most eccentric scratchings of a child intrusted with a pencil to amuse itself upon a sheet of paper, traversing it from side to side with the veriest intricacy of lines without design, and marking it here and there with blotches, and an uninstructed reader can have some idea of the wild circuits and criss-cross movements of the Protestant-German, Romanist-Imperial, Danish, Swedish, and French armies during the Thirty Years' War. It was complete chaos, and yet amid

all this there were some strokes of real strategy, and the victories won again and again on certain fields show that war, even under the direction of fools, as well as experts, has its natural lines of communication and strategical key-points, which latter inevitably attract the streams of war to collide and decide the phases of an apparently interminable war without recognized military objectives.

In his farewell address to the Swedish Estates (Bohn's Schiller's Thirty Years' War, 125–6), their noble king seemed to have a presentiment that he was to offer up his great life for faith and for freedom. No speech on record surpasses in manly eloquence this farewell of this good king to a brave people. No person of generous impulses can read it without feeling his heart throb, without feeling his eye moistened with tears, which are the tribute or response of a manly sentiment to the utterances of a hero. On 24th June, 1630, Gustavus landed in Germany, and thenceforward until he fell, 16th November, 1632, every step was one of a career of triumph. Like Hannibal descending into Italy with twenty-six thousand veterans to invade a country which could place seven hundred and sixty-eight thousand more or less trained soldiers in line of battle, Gustavus disembarked in Germany (1630) with only thirteen thousand eight hundred (H., i. 221) admirable troops to assail an empire that more than once placed armies of from sixty to seventy thousand in the field; had at one time one hundred and sixty thousand fighting men embodied (H., i. 252); had already carried on the war triumphantly for twelve years, and was still to hold out against Sweden and France and their allies for eighteen years longer. At Wismar, first decade of October, 1630, Gustavus first exhibited his new system of infantry tactics, and attack in column, or by (known as "Leipsic") brigades, in defeating the Imperialists under the Duke of Savelli. At Werben—considered by the distinguished "tactician" Von Bulow as the great strategical key-point of Germany—Gustavus displayed his exquisite genius in the selection of a position, and the defense of it by field-works. Against these the hitherto invincible Tilly experienced his first check, a foretaste of the annihilation which awaited him in the next collision. Here, too, the favorite pupil of Gustavus, Leonard Torstenson, first developed the astonishing power of the new Swedish artillery, as chief of that arm, and likewise his conception of the utility of protecting his guns with earth-works.

At Leipsic, 28th August, O. S., 7th September, N. S., 1631, Gustavus made a name which will endure as long as war has a history, a professor, a critic, or a student. It is undeniable that it is a victory not known to the majority of people, confounded perhaps with other Leipsics, but still recognized as a battle which decided the fate of human development, a redemption of our race as far as man can redeem it. It was a triumph of the resuscitated legion over the revived phalanx, of freedom in military evolutions against that slavery which fetters the

mind and the men, factors and adherents of the creed for which Tilly fought. Moreover, it was decided by the application of the principles which have won some of the greatest battles in this world, the *oblique order*. Only in this case, this principle entered into the arrangement through the defection of the Saxons and the consequent errors of the Imperialists. It may be claimed with justice, that on this occasion twenty-two thousand Swedes defeated thirty-two thousand veteran Imperialists under a general hitherto unconquered. This battle is well worthy the study which has been bestowed upon it. Still, with all that study, the strong points have not been made clear. Tilly undertook to crush his opponent with the mere weight of cavalry clad in iron, and infantry in masses, compacted by discipline and victory. Nevertheless, his attacks were dislocated, and he displayed very little tactical skill. On the side of Gustavus there was perfect harmony throughout the Swedish force, from the king down. Not a moment was lost. Artillery, a new feature, a manœuvring by batteries, was never better handled than by Torstenson. The Finnish cavalry made up by fire and celerity for what they lacked in weight, and a simple conversion like that which saved Mollwitz secured Leipsic. This battle crowned a career which has exalted Gustavus to the first rank among the few universally conceded greatest captains of all times.

He has been greatly blamed for not making a better use of his victory. His unsurpassed High Chancellor, Oxenstiern, in his way certainly as able a man as Gustavus in *his* own, sat severely in judgment upon him. Oxenstiern had previously declared that it was fortunate for Gustavus that the fire of the king was tempered by the phlegm of the minister; yet this very phlegmatic critic blamed the fiery king for want of audacity in not harvesting the fruits of this victory, an audacity which won for Napoleon his greatest triumphs. Oxenstiern declared that after Leipsic, Gustavus should have marched upon Vienna in the same way that, after Cannæ, Maharbal urged Hannibal to march at once upon Rome. Contemplating the marvelous results of audacity in all ages, and deciding in accordance with them, Oxenstiern was right.

Gustavus always acted in obedience to the strict rules of war.[1] He became greater and greater by experience or "gradual probation," as

[1] No great general has ever neglected the establishment of a secure base of operations and lines of communication, but what constitutes a base does not always respond to the technical definition. For instance, Rustow says that political relations sometimes became the base of the great commanders of antiquity, and in this spirit Gustavus made *Protestantism* his base, just as Napoleon had for his in Italy the phantasm of Freedom or Liberation; then the jealousies of the different sovereigns, as in Germany.

Napoleon said that the effect of the moral to the physical was as three to one, and human progress has shown that the effect of ideas is sometimes immediately, and always remotely, many times more potent than even disciplined force.

was said of Turenne. Of all the prominent men known to the writer, the one who will serve as his best representative in this country was our George H. Thomas, who illustrated himself thus, in his first battle at Mill Springs, and decided the Rebellion by his victory at Nashville; and the parallel holds good in almost every respect, physical, moral, mental, and military. Two of the king's pupils, so styled, and military successors, excelled Gustavus as "great captains"; and with less means and infinitely less authority, accomplished more. After all, does not the Art of War consist in obtaining great results with comparatively little means? Jan Baner was his superior as a soldier, but vastly inferior as a man. Torstenson was certainly a greater general, and only inferior in that he was a confirmed invalid, and on that account was unable to remain continuously in command, although he never lost a single feasible opportunity through infirmity while in command.

The career of Gustavus, subsequent to Leipsic, was limited to fourteen months and nine days. In that period he was engaged in three great conflicts: 1st, at the passage of the Lech, where Tilly, who had lost his invincibility at Leipsic, may be said to have lost his life (for he died of his wounds a few days afterwards); 2d, at Alte Feste against Wallenstein; and, 3d, at Lutzen, again opposed to Wallenstein. Here Gustavus lost his life.

This engagement of Alte Feste, before the lines of Nuremberg, belongs to a class of battles which embraces Collin, Cunersdorf, and Burnside's Fredericksburg. All these were desperate attempts to carry strong positions held by veteran troops protected by earth-works, in which the attack only just came short of success; for a moment appeared to hold success in its grasp. Gustavus, however, was the only one who brought off his troops in order in the teeth of active pursuit. At Lutzen, November 6 (16th), 1632, Gustavus displayed more enterprise than at any other epoch of his wonderful career. From his own language he seems to have felt an inmost consciousness that he was touching upon the term of his existence,[2] and he acted as if he appreciated that he had no time to lose. His grand tactics previous to the battle, in order to deceive Wallenstein, were certainly masterly, and the mighty imperial commander, who deemed himself invincible, was deceived. So much so, he divided his forces. Then Gustavus "went for

[2] Major-General Mitchell has a remark most pertinent in regard to the premonition of decease with which Gustavus was impressed at Naumburg a few days before his death-in-victory at Lutzen. The British officer and historian is alluding to Napoleon's betrayal of himself on various occasions, and attributes it to his experiencing "those vague and shadowy forebodings which often flit across the minds even of the brave, influence the timid, and for moments dispel the delusions that dazzle and inflate the vain, giving them passing but profitless gleams of their feebleness when contrasted with their pretensions." ("The Fall of Napoleon," vol. i. p. 116.) Bismark (Beamish, 104) observes, "Commanders generally forebode the crisis of their good fortune. Thus did Hannibal" before Zama.

him" with a will, although his reply to a remonstrance from one of his trusted subordinates, Kniphausen, proves that he felt he was acting rashly. His words are almost identical with those of Cæsar when he crossed the Rubicon, "The die is now cast!" "*jacta est alea.*"

In this battle Gustavus does not seem to have demonstrated his accustomed generalship, but all his intrepid soldiership. He attacked furiously, and, leading, was slain or assassinated, it has not been decided which even yet, as the system to which he was opposed has stricken down so many by the murderer's hand at the moment when they had become most dangerous to its policy; a policy which has justified, glorified, and rewarded such crimes. As general rejoicing followed with unseemly demonstrations throughout the Roman Catholic realms, and as Pappenheim, the arch champion or paladin of the Imperial army (who fell shortly after Gustavus, and on the same field), declared that he died content in that the great foe of his faith had perished, it is not unfair to believe that like Admiral Coligni, like William of Orange, like Henry IV., like the Count of Soissons, and like a multitude of other illustrious victims, Gustavus was assassinated.

The calm, sagacious Oxenstiern thought so, and his opinion is worth a multitude of counter-testimony.

Gustavus perished in the thirty-seventh year of his age. He died "with the sword in his hand, the word of command on his tongue, and victory in his imagination." But his greatest praise is that of which he was himself ambitious,—"that he might be regarded as the prince who had fulfilled the duties of that station which Providence had assigned to him in the world."

If ever on earth a soldier realized the ideas of St. Bernard in his hortatory address to the Templars,—an address worthy an evangelical prophet or apostle,—it was Gustavus. St. Bernard bade the Knights of the Temple remember that if from zeal for true religion and the diffusion of its influences they smote down adversaries, in slaying them they saved their own souls; but if actuated by ambition, pride, or any of the other ordinary incitements to battle they killed for glory and reward, in slaughtering these foes, even Paynim, they slew their own souls at the same time. Gustavus fought solely for the right and against wrong, and his career was a sermon which to live up to is as pertinent for to-day as for his epoch.

The victory which he foresaw through the bloody mist of death was wrenched from defeat by Bernard of Sax-Weimar and Dodo Kniphausen, with a desperate resolution best expressed, in the words of the prophet Amos, "as the Shepherd delivereth out of the mouth of the lion two legs or a piece of an ear." Nothing but a conviction throughout the Swedish army that it was utter disgrace to quit a field on which their king had fallen, that no life was worth preserving now that the loftiest had perished, made Lutzen a victory for evangelical truth.

Nevertheless, nothing but the crushing fear which fell upon the Imperialists converted it into the triumph which it morally came to be.

It is scarcely possible to do justice to the character of Gustavus Adolphus. A distinguished general and military writer, Cust, remarks: "It is perhaps the highest military encomium of Gustavus Adolphus that he was the greatest tactician of his age." Count Bismark (Beamish, 307) admits "that warlike King of Sweden was the creator of new tactics." This praise is but one hundredth part of what is due to him. Perhaps his best summary is the sentence of a contemporary, that "even his enemies could not utter a word of dispraise, unless they simultaneously praised him."

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Only two of the battles of Gustavus will be dwelt upon somewhat in detail, and only these because they are too important or, rather, interesting to a soldier to be passed over in silence: Wallhoff,[3] fought on the 7th of January, 1626, and Leipsic, or Breitenfeld, on the 7th of September, 1631. The first is famous as the conflict in which modern infantry tactics first received their practical development and demonstrated the superiority of this arm against the finest cavalry on ground most favorable to the latter; whereas Leipsic is still more remarkable as the field of the first perfect display or application, under fire, of the tactics of the three arms combined.

Wallhoff was the "first capital battle" in which Gustavus engaged and displayed all at once the effect of his inventions, ameliorations, and abilities. It is said that his success was due as much to "his *reformed* pike"[4]—the predecessor of the bayonet—as to any other single factor,

[3] Wallhoff or Wallhofen (Puffendorf, *Welfen*) is a small market town on the vast plain drained by one of the branches or arms of the Duna, or southern Dwina, and twelve miles distant S.E. from the Duna, in the Province of Semigallia (capital, Mittau) which constituted the eastern part of the Duchy of Courland. It stands not far off from the fortified town of Ascheraden, some fifty miles southeast of Riga. Semigallia extends southeast from the Gulf of Riga along the south or west side of the Duna, which runs between it and Livonia to the east and north, and is separated almost entirely from the Duchy of Courland proper by the river Malza. The name Semigallia has nothing to do with Gallia (France), but is compounded of two words belonging to the old Curish dialect of the Sclavonian, *Sem-Galle*, "land on the other side,"—*Courland* signifying flat land. To find and locate Wallhoff and other places mentioned in this campaign resort must be had to very old or detailed maps, and the description of this battle is only to be mined out from a variety of books now almost forgotten even by the learned.

[4] Would it be believed, if the fact were unsusceptible of proof, that the Fifteenth U. S. Infantry (and perhaps another regiment) were armed and equipped in part as pikemen? "*Experience soon proved the absurdity* of the project." (Halleck's M. A. & S., chap. x.)

It is very curious that the Swedish spear, or pike, which Gustavus Vasa *lengthened* by four or five feet,—to enable his new Dalecarlian levies to resist the veteran Danish cavalry, and with them, thus armed, won the battle of Westeras, 29th April, 1523,—his grandson Gustavus Adolphus *shortened* to render it more manageable, and, with it thus "reformed," defeated the Polish cavalry at Wallhoff.

although, after all, like the great majority of collisions between armed men, it was decided by valor or hard fighting. This is attested by the peculiar force of the allusion in the famous eulogy of Torstenson contributed anonymously by Gustavus III., which received the highest prize of the Swedish Academy.

"Fields of Wallhoff! you can bear testimony to Torstenson's valor! The enemy driven off, the soldiery gathered round the Life-Banner, victory given to Gustavus Adolphus! All indications of what Torstenson some day will be."

Of the forces engaged in this conflict—so important an epoch in the development of modern tactics,—a vast stride in advance—no one work affords any definite information. The clearest reference is to be found in John Loccenius, who wrote in Latin, in 1676.

Gustavus was noted for his winter campaigns; and no severity of weather deterred him from an endeavor "to set foot to the foe,"—his own expression. On the 5th of January, 1626, he crossed the Duna with his cavalry and a thousand musketeers. There is no other mention of his numbers. On the night of the 6th–7th of January he encountered a detachment of the enemy, drove them back, and, on the morning of the 7th, found the main body of the Poles drawn up in order of battle in the open field before their entrenchments, whence they had marched out in accordance with the message or reply from Leo Sapieha (their general) to Gustavus: "That having only one ambition, his desire was to make a fair trial with his majesty upon equal ground." The Polish magnate had the reputation of being an able commander, and he believed that no infantry had a chance on flat ground against such fine cavalry as the Poles undoubtedly had at this day.

Gustavus seems to have commanded the centre, Count Thurn, the father, the right wing, Gustavus Horn the left, Colonels Sigismund, Plato, and Maximilian Teuffel in support.[5]

Loccenius observes (Liber viii., 551): "Ours [the Swedes] meeting the Lithuanians . . . in the open field, defeated them in a famous battle through the singular prudence and extraordinary bravery of the king [Gustavus]. A more complete commemoration of this triumph is lost through the carelessness of historians. The Swedes were victorious with very little loss, . . . although numbers were not wanting to the enemy, since in the Polish army [were the flower of the Lithuanian

[5] The names of some of the Swedish commanders were startling. The Imperialists, after Leipsic, asked, pertinently, "how it was possible to conquer an adversary who had 'Death' and the 'Devil' in his ranks," and had "the Devil and the Devil's mother"—titles of two heavy field-pieces—among his artillery. In previous articles the writer has alluded to the signification of Torstenson's name,—the lion-hearted son of the tower or rock of Thor, or the Thunder-god. Stalhanske, the family name of a noted general, means steel-glove or gauntlet. Haubald signifies "cut down quickly," equivalent to "no quarter." This list might be greatly augmented.

troops, then thought the best in Poland], four troops or squadrons (*cohortes*) of Cossacks (400), two companies or troops (*turmae*) of cavalry, regular (?) cuirassiers (200), six companies (*signa*) of German infantry (about 900), fourteen companies 'cornets' or troops (*signa*) of Hussars [2000], and three of Heyducs [picked foot-soldiers or personal attendants, a sort of body-guard attached to the person of a sovereign or general of high rank] 400."

It appears that the Polish horsemen made a desperate charge upon the Swedish infantry and were repulsed, and then "a vehement (counter) charge of the Swedish cavalry decided the victory." Sapieha was totally defeated, left sixteen hundred dead on the field, lost a number of prisoners,—among these one of his generals,—all his artillery and baggage, and a great number of standards. The distinguished British military historian and critic, Sir Edward Cust, attributes this success to the arming, disposition, and tactics of his foot-soldiers by Gustavus. These, however, were not inferior to similar improvements of the same kind among his cavalry. As the latter were mounted on hardy but undersized horses, and those of his enemy, especially the Imperialists, on very large, heavy horses, whose very weight was likely to ride down inferior animals however brave their riders, he gave two impressive counsels to his own horsemen. First, "never to give fire with their pistols till they could see their own images in the pupils of their enemy's eye;" second, to cut "with an oblique, sliding motion" at the necks and heads, especially the necks, of the enemy's cavalry horses, so as to frighten and disorder them (the very practice said to have been introduced subsequently into the discipline of the Prussian cavalry). The latter order was in the same spirit as that of Cæsar's, who, knowing that Pompey's knights were chiefly men of rank and position who regarded disfigurement as worse than death, directed his veteran cavalry to aim particularly at their faces ("*fieri faciem milites*"). The great secret, however, of all the great Swedish king's successes was his formation of all the three arms into "one complicated but unperplexed machine," consisting of many independent fractions, all constituting one grand unit, "contributing to the perfect establishment of the *Whole-together;*" the "*Man-Legion*" (Michelet's expression) of Turenne.

General Lamarque styles the conflicts of Marshal Saxe "Battles of Posts" ("Positions" seems a better expression); such, as a rule, as were Washington's and Wellington's; those of Condé [as of Charles XII.], "Battles of Shock"; of Turenne and of Frederic, "Battles of Manœuvres"; and those of Napoleon, "Strategic Battles." Gustavus Adolphus united the systems of Saxe, Condé, and Frederic (d'Aldeguier's "Des Principes . . . de la Cavalrie, Page 60, Text and Note 1). "Human intelligence unceasingly occupied with questions relative to War, went on creating new methods or perfecting ancient ones. The

Art of War, cleared from the darkness which enveloped it, made continual progress under the impulse of such eminent men as Maurice of Nassau, Gustavus Adolphus, Montluc, Coligni, Henry IV., and Rohan. The genius of these captains, enlightened by the study of antiquity, excited by ambition, rivalry, or fanaticism, continually resurrected, discovered, or created the grandest combinations of the science of battle, and laid the foundations of modern tactics. Thenceforward leaders showed themselves rather as Captains than soldiers; great Generals commanding little armies achieved the greatest results; they knew how to derive advantages from the smallest circumstances, to deliver battle on all sorts of ground, and to unite *force* to *mobility*. 'Our battalions (to use the expression of Puysegur) after the sixteenth century were no longer to be as formerly, simply SOLID corps, but were capable of being considered equally as DIVISIBLE and FLEXIBLE. The whole Science of War is summed up in these two words.'" ("L'Armée Française," i. 370.)

Gustavus comprehended this and first applied it in practice.

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The Battle of Leipsic 1st, or Breitenfeld 1st, has excited more admiration, comment, and criticism, yes, and hypothetical consideration, than any other which has ever been fought: whereas the report of Gustavus is so clear that it is almost impossible to better it, except to describe the relative positions of the army and localities to which he does not refer. In fact, almost all the reports of the most prominent generals during the Thirty Years' War are remarkably truthful. There are exceptions, but strictly in accordance with the good or bad characters of the writers.

When two armies of veterans, recruited among bold and warlike nations, meet in conflict on open ground, the result must be credited to the successful general unless Providence intervenes directly, which interference some men style accident, chance, fortune, or luck. The ancients attributed it to Fate, to whom Jupiter himself was compelled to bow. There is another great element in success—unanimity; but this, again, is due to the supreme chief, especially where he is at once General and Autocrat, King by the Grace of God, and Sovereign Despot by the force of Discipline. Many readers will remember the remark of Frederic the Great to Joseph II., Emperor of Austria, at one of their interviews and mutual military displays in 1769 and 1770, that the most remarkable fact connected with the whole spectacle was the perfect subordination to their will among so many tens of thousands, who comprised thousands again (compulsory recruits, crimped or kidnapped) who would like to kill either of them, and would do so were it not for the infernal stringency of the iron discipline which had inextricably enmeshed the unfortunates and kept them in a condition of hopeless subjection and individual impotence. Gustavus had an additional strength,—the

boundless love of his people and the devotion of his troops; he possessed the affection, respect, and confidence of all.

> "What render'd this Gustavus
> Resistless and unconquered upon earth?"

asks Wallenstein in Schiller's "Piccolomini," considered one of the most truthful exhibits of the times ever published, taking together his three Historical Dramas, "Wallenstein's Camp," "The Piccolomini," and "The Death of Wallenstein." He answers his own question,—

> "This—that he was the monarch in his army.
> A monarch, one who is indeed a monarch,
> Was never yet subdued but by his equal."

That is, one who was King and Generalissimo in one.

There were two battles of Leipsic during the Thirty Years' War fought between the Swedes and the Imperialists. In the second, 23d October, 1642, Torstenson, the Swede, occupied almost the very same ground on which Tilly drew up his "*Armada*," on Wednesday, the 7th of September, 1631. The approach to the battle-field proper was by a narrow isthmus of firm ground, leading through a swamp drained by the Loberbach. It is difficult at this day, when everything is so much changed, to understand the danger and defensibleness of this Pass of (Schelkau?) Scholka.

That its unmolested passage was deemed of such importance proves that it was not only difficult, but perilous. Perhaps it was the only isthmus between the marshes which afforded the means of transit for the material and the cavalry. The adjoining morasses, like those at Monmouth, where Clinton halted the night after the conflict, may have been impassable, even to infantry, in wet weather. It is well known that Torstenson permitted the Archduke Leopold to traverse this defile without opposition, because he was determined to allow the Imperialists no chance of escape if they were defeated. He did defeat them, and their rout almost amounted to ruin. Tilly may have been actuated by the same motive, although he did not despise his opponent. He had tasted of his quality at Werben, 17th–26th—particularly 25th—May, 1631, and had reason to conclude that the task before him was the hardest which had been set for him in his whole course of over thirty years of military training, in which he had never been beaten, but had been victorious over every antagonist in thirty-one (Bismark says thirty-six) pitched battles and lesser engagements.

Pappenheim, next in command, was very anxious to attack the Swedes as they defiled through or across the Pass of Scholka. Tilly would not listen to this, and expressly forbade it. Some narratives describe such an aggressive by Pappenheim with two thousand cavalry, which was so rudely repulsed that Tilly had to hurry forward

reinforcements to bring him off. Still, as Gustavus in his report and Von Kausler in his criticism are silent as to this, it is likely it was confounded with the subsequent flank attack in greater force, which ended, after hard fighting, in the rout of Pappenheim, which terminated in his disappearance from the theatre of action. Consequently, Gustavus emerged on to the solid plain, and was not long in forming his line of battle. General von Kausler attributes five (Harte, ii. 26, nine) principal faults to Tilly, of which the first was his failure to attack Gustavus whilst defiling through the "pass."

After all the discussions as to the numbers opposed, it is pretty well settled that Tilly had at least twenty-one thousand veteran infantry and eleven thousand excellent cavalry, of which thirteen regiments were heavy and five (Isolani's Croats, or Crabats) light, and thirty-six pieces of artillery of large and small calibres. He drew these up in a single line, his infantry constituting the centre, Pappenheim's six regiments of heavy cavalry the left, and Furstenburg's seven the right. This disposition and the total absence of a second line, or any force in reserve, constitutes the second charge emphasized by the Wurtemberg adjutant-general, military historian, and critic. The third was the ill-judged selection of a fixed position not easily susceptible of alteration for his artillery (16- and 24-pounders), on elevations *to the rear* of the Imperialist line of battle. In consequence of this Tilly's guns not only embarrassed, but were actually damaging to, the attacks which he allowed or ordered.

The village of Breitenfeld, which gives its name to the different conflicts on the plain below, to the south, lay in the rear of Tilly's left centre.

Gustavus brought into the field thirteen thousand Swedish infantry and nine thousand cavalry, together twenty-two thousand, with one hundred cannon, distributed in fourteen batteries, besides the light regimental guns served each by one or two constables, the whole under Colonel Torstenson (afterwards Grand Master of the Swedish Artillery, and from 1641 to 1645 Generalissimo). The Saxons who were to support him—and afforded as little real assistance as the Spaniards did to Wellington in the Peninsula—numbered eleven thousand foot and four thousand horse, with (number nowhere given) guns. So little dependence did the Swedish hero put in the Electoral troops that he drew up his own army entirely independently, so that the Saxons assumed a totally different formation, and were separated from his left by a broad country drain, or *Flussgraben*, in which, although the water was shallow, there was a deep deposit of soft mud, thus forming an excellent wet ditch for the Swedish left in case the Saxons did not stand their ground. These latter were opposed to Tilly's right, consisting, as stated, of seven regiments of cavalry and five *Tercias* of infantry, besides the Croats.

It is well known that the new tactical organization introduced by Gustavus was mobility itself in comparison to the formations adhered to by the Germans. The Swedish "Leipsic brigade" corresponds more closely to the modern Brigade than any previous disposition of troops. It was divided into two demi-brigades,—a term revived by the first French Republic,—or into four battalions, so that this Leipsic brigade comprised about two thousand five hundred men.

Gustavus disposed his Swedes in three lines. He personally commanded the right of the main line of battle, Teuffel the centre, and Horn the left. Either wing of this line was composed of cavalry, sandwiched with detachments of "commanded (*i.e.*, selected) musketeers," or sharp-shooters. The second line, under Baner, was in the rear of the right and centre. The third line, like the first, was divided into centre, right, and left; the former was infantry, under Hepburn, a noted Scottish officer, and the two latter were cavalry, respectively under Baudissen and Hall.

Two hundred and fifty years ago, when battles were regulated with almost the punctilio of duels, great stress was laid on gaining a position where the sun was on the soldiers' backs and the wind was in the faces of the enemy. Tilly was fortunate in securing both of these advantages, which, on this occasion, were decidedly so, since a strong breeze, blowing over a parched, loose, plowed soil, carried with it such volumes of dust that, mingled with the powder-smoke, it almost blinded the Swedes.

Bear this in mind.

A heavy cannonade saluted Gustavus while making his dispositions. In this the Imperialists at first had every advantage, but as soon as Torstenson got his guns into battery the tables were turned, and they fired three shots to the enemy's one. The artillery orchestra opened with a *coup d'archet* on the side of the Imperialists about the same hour as at Waterloo, 11 A.M., although some say 12 M., and the cannonade lasted until 2 P.M. Tormented at once with the intolerable stinging dust, as well as by an oblique fire from Tilly's main battery, whose missiles tore obliquely through all three lines of his right-centres and right wings, Gustavus, to neutralize or overcome these evils, brought his soldiers' right shoulders forward to accomplish a change of front or position. This seems to have left a gap between the lines, into which Pappenheim threw himself with the whole ardor of his character and the entire cavalry of Tilly's left. To meet this desperate shock Baner changed front, *en potence*, at right angles to the first line, just as at Mollwitz the three Prussian grenadier battalions, crowded out of the front line, formed a flank which repulsed the Austrian cavalry completely victorious over those of Frederic. Pappenheim, after admitted sevenfold returns to the charge, was repulsed by the fire of the musketeers and counter-attacks of the brave Finnish horsemen. To extricate Pap-

penheim, the Duke of Holstein, who commanded Tilly's left infantry brigade, pushed too boldly forward. In this generous attempt he lost his life, and his command was literally destroyed. Next in order Tilly himself, with his veteran infantry centre, attacked the centre and left of the Swedes, and was driven off. His right wing, the cavalry under Furstenburg, then fell upon the Saxons, formed, as stated, independently to the left of the Swedes. These had been previously simply skirmishing with the Croats. This new assault routed them. With the exception of a few detachments, they disappeared from the field, and absolutely helped the Croats—always, and even down to very recent times, addicted to plunder—to rob the baggage of their own sovereign, as well as that of his ally.

Now occurred Tilly's greatest blunder,—his fourth, according to Von Kausler,—the loss of so much precious time that he not only afforded a breathing-spell to Horn, commanding the Swedish left, but afforded him the opportunity to form *en potence* on this side, just as Baner had done in the opposite quarter, behind the large *Flussgraben*, or drain, deep with mire. Meanwhile, Horn was reinforced by several regiments brought over by Gustavus himself. All this time a large portion of Furstenburg's cavalry, of Tilly's right wing, were exhausting themselves in pursuing the flying Saxons.

Horn had fully established himself partly at right angles to his original position, when Tilly, having formed his infantry into four enormous tercias, or divisions, massed without intervals, assailed the Swedish left. This assault seems to have enveloped the Swedish left so that one portion of it fired to the front, the second to the flank, and the third obliquely to the left rear. Hall, who commanded the Swedish left rear, fell in repelling the attack, and Callenbach's regiment, in the opposite direction, was annihilated. The situation for a brief space—some say for fully two hours—looked dubious, when Hepburn brought up the reserves, and after a terrific struggle the Imperialists were beaten off, especially, it is said, by the platoon-firing of the Swedish infantry, first practiced on this field. This unexpected and novel rapidity and simultaneity of fire at short range astonished the Imperialists at the same time that it mowed them down. Gustavus had impressed upon his musketeers the caution not to fire until the enemy were in such close proximity that their bullets would penetrate armor. Such self-possession on the part of an infantry line has often decided a battle; and it is well known that on the Plains of Abraham a single volley of the British infantry within thirty yards settled the fate of the French dominion in America, and placed its key—Quebec—in the possession of the British crown.

After the Imperial cavalry had been disposed of on both wings Tilly, himself wounded and contused, abandoned the field of battle amidst the reiterated counter-attacks of the Swedes, who had mean-

while captured his own heavy batteries and turned them upon his worsted and disordered troops. Five [four?] regiments of veteran Walloon infantry, picked men, covered by their spontaneous manœuvring the withdrawal and flight of their comrades until they found refuge in a wood to their rear, when night, prematurely darkened by the volumes of dust and powder-smoke, put an end to the fighting.

In all this nothing has been said of the fearful effects of the admirably-worked Swedish artillery, because general historians have not given it mention or attention. The Swedes, however, have not forgotten its services, nor the influence of its commander, Torstenson, who may be claimed as the developer, if not the organizer, of this arm. His light leather regimental guns were rapidly brought up at each crisis with a celerity hitherto unknown, and opening upon the dense masses of the Imperialists with discharges of canister-shot, delivered with more rapidity than the infantry volleys, did tremendous havoc, and must have greatly demoralized even veterans hitherto unaccustomed to such rough handling.

Tilly lost half his army and all his artillery, his camp and camp equipage, spoils or plunder, and trains in this battle. He left eight or ten thousand killed and wounded on the field, and lost besides three thousand prisoners. The Protestant Saxon peasantry, who in many instances had suffered all but death, fell upon the bigoted and persecuting fugitives and slew them without mercy. It is claimed that next morning not more than fifteen hundred out of the original force of thirty-three thousand remained with their colors. Not but that many did subsequently reassemble, but for the present this army which had kept Germany in awe for so many years and won such a series of victories was utterly dissolved. Von Kausler in summing up the results of Breitenfeld emphasizes "the total want of unanimity [either of purpose or action] among Tilly's generals in the dispositions [carrying out of the attacks], whilst the Swedish generals acted at every point with the most perfect harmony as to themselves and their king and commander."

The same jealousies which exercised such a fatal influence upon Napoleon's affairs in Spain and more than once threatened evil results, even when he was present; which were not wanting in our own armies during the recent great war; characterized the action of the principal Bavarian and Austrian commanders throughout the whole Thirty Years' War, with the exception of a short period when the Roman Catholic League took the initiative. This discord cleared the way for the advance of Gustavus; as just shown, the overwhelming results of Leipsic were due to it. At the second—Torstenson's—Leipsic it again manifested itself, but never so pointedly as at Janikau. On the other hand, it once came very near being fatal to the Swedes. Nordlingen was undoubtedly lost in consequence, and it is more than probable that if

Torstenson had not risen from his bed of pain in obedience to the dying bequest of his army to him by Baner, that army so bequeathed to him as the only one capable of handling it would have dissolved under the rivalry and jealousies of the subordinates of the dead hero. Torstenson, as soon as he arrived, gathered together the parting fibres with an iron hand gloved with velvet, and from that time forward until he resigned there was never the slightest jar in the working of the war-machinery.

Gustavus Adolphus! This name once filled the mouths of Europe with enthusiastic admiration, love, reverence, and hope. His memorial might be presented in a series of pictures, each blending the heroic and the lovable, extracted from dry histories, ringing poems, attractive romances, honest eulogies, pious narratives, in fact, every different kind of composition to which genius and appreciation lend charms, in the attempt to do justice to a subject which engrosses all the better feelings of intelligent humanity. He was the cynosure of every eye, the thought of every heart, the idol of every people pining and suffering for religious freedom, the man of the epoch, the fearless soldier, the worshiped sovereign, the adored husband, the Man of the Century, and the Hero of the fellest war that ever desolated, for nearly one-third of a century, the richest and most cultivated districts of Europe, from the Oder, dreaming through its dreary plains of sand, to the Rhine, rushing between its castellated rocks; from the Danube, flowing amid scenes unsurpassed in loveliness, to the brackish Baltic, washing its barren coast where Pytheas, about twenty-two hundred years ago, first found the mysterious amber, and from the foggy regions—into which he was the first navigator known to have penetrated—brought it back to the sunny shores of the "Gulf of the Lion" to fill its Greek colonists with astonishment and inspire them with a cupidity which lured the seamen of the Mediterranean to seek tin and pearls in Britain and a hundred other natural objects of traffic, which never ceased to awaken the wonder of the Southerners until the Northmen, led by their Berserker Vikinger, excited still greater amazement by their visits, ravages, and conquests, in their fleets of "Keels."

To apply the words of Lamartine, in regard to a great but far lesser national representative, Gustavus "was a public man in all the greatness of the phrase,—the soul of a nation personified in an individual,—the inspiration of a people in the heart of a patrician [of a king]. His oratory was something as grand as his action. It was the heroic in language. The echoes of it [G. A.] were heard, were felt all over the continent" [of Europe], and even on the shores of this new world (along the Delaware), and the strokes of his sword made Kings and Emperors tremble, and lifted the hearts of nations from the darkness of despair into the full light of renewed confidence and life, infusing the strength of that Hope which the inspired penman characterized "as an anchor of the soul."

If ever there was a man in this universal world—to use a vulgar expression, equivalent to President Taylor's superfluity in one of his messages,—"the whole of the world and the rest of mankind," which nevertheless is forcible in its idea of the totality of humanity—who was thoroughly permeated with the spirit of Christianity, it was Gustavus Adolphus. He realized in sober reason the tradition of Frederic Barbarossa, of whom Menzel paints such a magnificent word-picture, when, amid the complex phases of the Battle of Iconium, A.D. 1190, the news was brought to him that his son was slain. The young prince, with a portion of his army, had preceded his father in the attack upon the infidel hosts, and a messenger came speeding back to the old, red-bearded Kaiser with the intelligence that his son had fallen. The aged head of the bereaved father sunk upon his breastplate, and huge hot tears ran down the chasms of his cheeks upon his grizzled beard, while his chieftains around sobbed and wept in sympathy with the grief of their imperial leader. All at once, lifting his teeming eyes to heaven and simultaneously his ponderous sword, he cried out, "On! on! if my son be dead, Christ still lives! Christ conquers!" His son was not dead, and he rescued him. (V. Kausler's "Worterbuch der Schlachten," iv. 352–355.)

The spirit of Gustavus was the spirit of Paul,—"All for Christ." His first act on landing upon the soil of Germany was to kneel in prayer. He was wont to say that a man who had said his prayers in the morning had accomplished half his day's work. His watch-word at Leipsic, and again at Lutzen, was Immanuel,—"Christ," or, "God with us." At Naumburg, when the people thronged him, kissing his garments, his boots, the very equipments of his horse, adoring him as if he were a god, he reasoned as Paul at Lystra, that such devotion, unfitting to a mortal, would be punished by his being taken away. And he went into his final fight at Lutzen with the same subjection of his will to God, and died with it on his lips. If ever there was a Christian soldier in the fullest and grandest sense of the word, it was this Gustavus, "the 'foremost man' of all this modern world."

Tilly, his veteran opponent, was a cold-blooded instrument; and Pappenheim, a fearless, fiery bigot. Wallenstein was a grand intellectual skeptic, far ahead of his time in independence of judgment; but Gustavus was truly as much the servant of God as the typical David, or the peoples' and prophets' favorite, Josiah, or "Christian" in Bunyan's incomparable "Pilgrim's Progress."

> "The Swede is fighting for his good old cause,
> With his good sword and conscience,"

declares Gustave Wrangel, general of the Sudermanian Blues; and to Oxenstiern's opinion,—

"It might yet be an easier thing from nothing
To call forth sixty thousand men of battle,
Than to persuade one-sixtieth part of them
* * * * * *
To break their oaths,"

the beliefless Wallenstein replies:

"And he thinks *so*? He judges like a Swede,
And like a Protestant. You Lutherans
Fight for your Bible. You are interested
About the cause; and with your *hearts* you follow
Your banners. Among *you*, whoe'er deserts
To the enemy, hath broken covenant
With two Lords at one time."

Listen to what the hero-singer says of Gustavus,—the hero-singer, for there are minstrels who do not play on musical instruments, or sing to them, but who play on the sounding strings of many thoughts, the harp of truth, and utter ideas that are more full of melody than all the poets together, save Dante, Shakspeare, Byron, and Schiller. Listen to Carlyle:

"But when Gustavus landed, and flung out upon the winds such a banner as that of his,—truly it was required of a Protestant Governor of men to be able to read said banner in a certain degree. A Governor, not too IMperfect would have recognized this Gustavus, what his purposes and likelihoods were; the feeling would have been checked by due circumspectness: 'Up, my men, let us follow this man; let us live and die in the Cause this man goes for! Live otherwise with honour, or die otherwise with honour, we cannot, in the pass things have come to!'"

And we Americans had such a man, George H. Thomas! and they killed him; not with a bullet, or a knife, or—no, not with any material weapon, but the deadliest of all,—injustice.

* * * * * * * *

Schiller makes this same Wrangel avouch,—

"it never was
For Judas' pay, for chinking gold and silver,
That we did leave our King by the GREAT STONE,"—

the only monument which the great Gustavus had in the land he saved for nearly two hundred years; and this boulder—the Swede's Stone—is perhaps Germany's truest *Ehrenbreitstein*,—"broad stone of honor."

Gustavus did not fall exactly where the Swede's Stone rested. He expired about forty paces distant, on a ridge between two furrows, where once an acacia-tree stood. That the stone was placed as a memorial

was not due to any public effort. A Smaland trooper, who had been wounded beside the king, was brought to Meuchen, whither the royal corpse had been conveyed. When his wounds were healed he enlisted the willing services of thirteen peasants of the hamlet, and they selected the boulder. Amid "sighs and wailings" they rolled it on until their efforts to move it farther proved unavailing. There, embedded, it remains the token of a "common soldier's" fidelity, the Saxon peasantry's gratitude, and until recently the sole monument of the man without whom, under God, Paul's and Zwingli's and Luther's work might yet be in vain,—the spiritual enfranchisement of the great and world-influencing Saxo-Teutonic race.

To Gustavus was applicable, even more than to Marco Bozzaris, the magnificent lines (in regard to the death of a Champion of Liberty in the arms of Victory) of Halleck's Lyric, by many considered among the finest ever written:

"But to the hero, when his sword
Has won the battle for the free,
Thy voice sounds like a prophet's word;
And in its hollow tones are heard
The thanks of millions yet to be.
Come, when his task of fame is wrought—
Come, with her laurel leaf, blood-bought—
Come in the crowning hour—and then
Thy sunken eye's unearthly light
To him is welcome as the sight
Of sky and stars to prisoned men;
Thy grasp is welcome as the hand
Of brother in a foreign land;
Thy summons welcome as the cry
That told the Indian isles were nigh
To the world-seeking Genoese,
When the land-wind, from woods of palm,
And orange-groves, and fields of balm,
Blew o'er the Haytian seas."

NOTE.—Any one who desires to know how the Swedish soldier of 1620–48 was clothed and armed, can see an effigy of one of the infantry of Gustavus standing in the corner of one of the rooms containing a collection of American uniforms in the U. S. Arsenal, near the U. S. Naval Asylum, in Philadelphia. This effigy was purchased from the Swedish National Exhibits at the Centennial of 1876, a collection which comprised others that it is to be regretted our government did not secure.

J. WATTS DE PEYSTER,
Brev. Major-General S. N. Y.

THE PROGRESS OF TORPEDO WARFARE.

THE idea is prevalent among many thinking men that universal peace can only be obtained by so increasing the destructive power of military weapons that war will, by mutual consent of nations, be deemed too terrible a resort for the adjustment of difficulties, and the advocates of this idea can point to no more striking example than the development of the science of submarine warfare. The repeating rifles and the machine guns, with their murderous power of slaughter, have slain their tens of thousands in order to demonstrate their qualities as peace-makers, while the torpedo, from its inception in 1776 up to the present day, has not destroyed more than forty vessels and less than one thousand lives (the statistics show less than five hundred lives, but they are always necessarily inaccurate), and yet the moral effect has been so great that during our own war the South were enabled to make a most determined resistance on their sea-coast and in their rivers; while since that date, though there have been three great wars in Europe, and one petty one now going on in South America, there is not one single instance on record of an attack by ships of a harbor that was even supposed to be defended by torpedoes.

Before our war the use of the torpedo was considered analogous to that of explosive bullets and fever-infected rags; but during and since that eventful epoch it has become a recognized weapon of warfare. The strong feeling prevailing against the use of such an implement has not only disappeared, but, on the contrary, the torpedo has risen so high in favor that many people, especially in the United States, appear to be under the impression that it is the one grand implement of the future, and that it will entirely do away with guns, navies, and forts. Its cheapness is its special recommendation, and the idea that the enormous and increasing expense of modern armaments can be avoided by a cheap infernal machine of universal application is a very fascinating one. Time, however, which eventually dissipates all hallucinations, will undoubtedly remedy this one, and will demonstrate that the torpedoes of the future are not remarkably cheap, and that they are, after all, only a most valuable auxiliary by which the other defenses of a harbor may be utilized to their fullest extent, and that they cannot be relied on as the *sole* defense of any but unimportant harbors.

The discovery of the fact that gunpowder would explode under water is due to David Bushnell, a native of Connecticut, and to him is also due the conception of the idea of utilizing this knowledge by the blowing up of ships, and the invention of a means of doing it so ingenious as to entitle him to be considered as one of the most brilliant minds our country has ever produced. His experiments were made from 1772 to 1775, and resulted, according to *Niles' Register* (a contemporary publication) and other authorities, in the production of a kind of submarine boat large enough to contain one man, with air for half an hour's breathing. It was shaped like a turtle, and floated in the water with the tail down. The operator was seated in the middle, the seat forming a brace between the two sides, and in this position he had his eyes opposite one of the numerous glass plates in the cover, or top of the boat. In front of him was the handle of a screw by which the boat was propelled; another by which it was raised or lowered; a compass marked with phosphorus; a water-gauge to show the depth, marked with oil and phosphorus; and near him the handles, or treadles, of various small pumps, by which water and foul air were expelled; the rudder could be moved, ballast let go, etc. The torpedo, or submarine magazine, as Bushnell called it, consisted of a block of oak containing the charge of about forty pounds of powder. This block was on the upper after part of the boat, and connected, by means of a rope, to a wood screw, the handle of which was directly in front of the operator. The mode of operation was to come up under the bottom of a vessel and attach the torpedo by means of the screw. The torpedo and screw were both then detached from the boat, a clock-work mechanism inside the torpedo being set going at the same time, which would run long enough for the operator to reach a safe distance before it exploded the charge. This ingenious but complicated apparatus was tried on the English man-of-war "Eagle," lying in New York harbor, in 1776, and only failed because the operator struck an iron bolt in the bottom of the vessel with his wood screw, and in trying to shift his position he lost the ship. The effect, however, was such that the English vessels afterwards established a regular drill for sweeping their bottoms with chains at frequent intervals, to prevent the possibility of any future attempt of the sort. Bushnell tried other species of torpedoes with no success, and afterwards went to France with his inventions; but, failing to accomplish anything, he became disgusted, changed his name to Bush, and died as a school-teacher in Georgia somewhere about 1830.

The next experimenter in the field of torpedoes was Robert Fulton, who worked in France, Holland, England, and America from 1797 to 1810, and then turned his attention from the unfruitful field to that of steam engineering. Fulton's ideas were very much the same as Bushnell's, and they met the same fate. Washington characterized Bushnell's attempts as an effort of genius, but a failure, while Lord St.

Vincent told Fulton that Pitt, the Prime Minister, was a fool to encourage a mode of warfare which, if successful, would ruin the supremacy of England on the ocean. To Fulton is generally accredited the word torpedo, the term being probably derived from the electric eel, though his torpedoes were not electric.

Following Fulton came Colonel Colt, who experimented most successfully with electric submarine mines from 1829 to 1844, both in private and in public; but the subject does not seem to have made any particular impression as to its value, and Colonel Colt abandoned it for his successful career as an inventor of fire-arms.

The Crimean war, from 1854 to 1856, affords the first instance of the systematic employment of submarine mines, in the defense of Sebastopol and Cronstadt; but, in addition to the fact that many were found with the safety-caps on, the ordinary charge of twenty-five pounds of powder was too small to do any damage.

In the Austro-Italian war of 1859, Venice was protected by an elaborate system of electric mines, but (probably in consequence of it) no attempt was made on the harbor.

Coming to our own war in 1861, we arrive at the period from which dates the present important position of the torpedo as a weapon both of offense and defense, and during this war thirty-six vessels were destroyed or severely injured by them.

In the Paraguayan war, from 1864 to 1868, torpedoes were used, but only one Brazilian ironclad was sunk.

In the Austrian war of 1866, Venice was again defended in the same manner and with the same result as before, and in the Franco-Prussian and Turco-Russian wars the German and Russian harbors were considered by their enemies to be equally impervious.

Having thus roughly traced the history of submarine warfare up to the present time, it remains to show what is now being done, and the direction in which ingenuity and military science is tending with reference to the perfection of the different varieties of the weapon.

Torpedoes are commonly divided into two general classes, offensive and defensive; by the former being understood those which are used in attacking an enemy, and by the latter, those which are used in defense against him. The distinction is hardly a correct one, however, for in the defense of a harbor all kinds would be used, and, strictly speaking, the terms fixed mines and movable torpedoes give a more accurate idea of the leading characteristics of each.

Electrical fixed mines are at present considered by most authorities to constitute the principal torpedo defense of a harbor, and strenuous efforts have been and are being made by the prominent maritime nations of the world to perfect systems at once reliable and simple, a matter of by no means easy accomplishment, as has been found. The problem presents such a variety of difficulties, according as the harbor

is wide or narrow, the water deep or shallow, the current rapid, the bottom soft or rocky, much rotten ice in winter, etc., that the mere physical difficulties are startling, to say nothing of the electric ones. When to these are added the unwearied efforts of an active enemy in dragging for wires at night, with all the present appliances for that purpose and the hundreds of others that will undoubtedly be invented, it is hardly possible that fixed mines can ever be relied on to the exclusion of guns and forts, and they will principally be depended upon as a valuable means for keeping the enemy a longer time under the fire of the forts. Guns and electric lights are absolutely necessary for the proper protection of a system of electric mines, because the latter cannot be planted close enough together in a harbor to prevent boats operating between them. It has been found that the shock of explosion of one torpedo will explode its neighbor, or at least crush its case at a distance far beyond where it would injure a ship, and even mines of moderate dimensions cannot be placed at a distance from each other less than one hundred feet, while the English rule for spacing five-hundred-pound mines is two hundred feet.

In general terms it may be stated that the mines consist of iron cases containing from one hundred to five hundred pounds of gun-cotton or dynamite,—gun-cotton being about six times, and dynamite about twelve times, as powerful as gunpowder. Gelatine glycerine will also probably be used when its properties are more fully understood, as it contains, for the same weight, still more nitro-glycerine than dynamite does, and is still a solid,—the disadvantage of pure nitro-glycerine being that it is a liquid. These cases are planted either singly or in groups in zigzag lines across a harbor,—on the bottom, if the water is shallow, or made buoyant and anchored, if the water is very deep. They are connected with the shore by means of heavily-armored cable-wires, the cables being united in one near the shore and carried up through a deep, covered trench into the commanding fort. By the English method, which is the one generally in use, the principal cable at the bottom of the harbor contains seven wires. It terminates in a "junction-box," having eight openings, and from this box seven single-wired cables radiate. Each of these single wires has at its extremity a single torpedo or a group of them, to be fired simultaneously; besides these there are a few scattered mines unconnected with any group.

Usually the torpedoes are also electrically connected with small buoys, rising within ten or fifteen feet of the surface, and containing electric "circuit closers." A vessel striking one of these buoys will instantly explode the mine underneath, which can also be discharged at will by an operator on shore. The electrical apparatus must be so devised and mechanically so perfect that the fuse of each individual torpedo can be continually tested, and each will automatically indicate to the operator in the fort, by ringing a bell or otherwise, when

it leaks or when itself or its wire is tampered with. All this has been practically accomplished; but the difficulty remains that defects may occur at the last moment when under fire of the enemy, and any accident to the main cables, through treachery or otherwise, would render the whole system connected with that particular fort as harmless as a spider's web. It is one of the consequences of modern advancement in the sciences, as applied to warfare on the water, that every increase of destructive power is attended with a corresponding delicacy in some vital part of the destroyer, and electrical fixed mines are no exception to the rule. They are immensely better than automatic fixed mines in the defense of a harbor of any importance, from the fact that by detaching the firing battery they are rendered entirely harmless, and up to the time the enemy actually attempts to pass they form no obstruction to the ordinary business of the port, while at all times before he arrives their condition is constantly known. It may be remarked in this connection that there is still one problem in submarine mining which has not yet been *practically* solved, viz., to so construct a buoyant torpedo or circuit closer buoy that it will *automatically* remain at a constant depth under water. It is obvious that there should never be anything on the surface to mark the position of a mine, and yet where there is great rise and fall of tide this is now impossible, unless the torpedoes are on the bottom and unprovided with circuit closers. The Bay of Fundy, where the rise of tide is upwards of fifty feet, would be an extreme example. Automatic fixed mines permanently obstruct the harbor as soon as they are planted, for even if a narrow channel is left open they are liable to be drifted into it during strong gales or extraordinary tides. The Confederates lost five vessels from this cause. They are exceedingly dangerous both in planting and in raising,—many lives were lost in the latter operation, both in our own and the Franco-Prussian war; and last and worst defect of all, they can never be tested after they are once planted,—a matter of the utmost importance, since from the time of their immersion they are continually under a hydrostatic pressure of about half a pound to the foot, according to the depth at which they are submerged,—a pressure which continues forever in unceasing search of any minute defect in shell or fuse. When powder was used, as in our war, a leakage in the shell was fatal, now, however, the effect of moisture is trifling on gun-cotton, and still less with dynamite; but the fuses must always be dry, and it is the continual knowledge of their condition that renders an electrical system so much more to be relied on than an automatic one. A very successful form of automatic fixed mine used by the Confederates was a barrel fitted with a cone of light wood at each end, to make it ride well in a current. This barrel was filled with powder and fitted with five sensitive contact fuses on the bilge, and was then anchored by a chain to the bottom, so that the barrel would float a few feet under the sur-

face. Another very formidable species was a combination of obstruction and torpedo like a submarine fence, with iron torpedoes bolted to frames at intervals.

A complete electrical system of mines has not yet been tested in actual warfare, though isolated electrical torpedoes have been successful in three cases,—that of the "Commodore Barney," seriously injured, and the "Commodore Jones," destroyed during our war, and the Turkish gunboat "Suna," destroyed during the Turco-Russian war. The "New Ironsides" was anchored for an hour and a half directly over a five-thousand-pound electrical mine in the attack on Charleston in 1863; but the Confederates were unable to explode it. As this mine (which was, electrically speaking, a crude affair) had been in the water for a considerable period, it is probable that there was some leakage or defect in the electrical connections which there was no means of discerning, or else that the fuse was destroyed by too much testing; but it is a curious fact that some time afterwards an individual presented himself to our authorities and exhibited a small section of electric cable, which he claimed to have cut from the connections of this identical mine at low water, where it was never discovered.

The fact of electrical mines not having caused greater actual destruction in the latest wars bears significant testimony to the moral value of a means of defense, a knowledge of whose mere possibilities has been sufficient to keep the war vessels of an enemy at a respectable distance from the harbors so protected. During the Franco-Prussian war the French fleet never even attempted to attack the German harbors, one of which is known now to have been only defended by dummy torpedoes, without an ounce of powder in them. In the Turco-Russian war the superiority of the Turkish fleet was completely neutralized by the Russian torpedo defenses, which were supposed to be most complete. Odessa was never sighted, and Sebastopol only once, by the Ottoman fleet, and not one torpedo attack was made by them during the war. The principal Russian ports were well defended, and even the numerous bridges across the Danube were protected by triple lines of torpedoes; but the Turks supposed that the whole of the Russian Black Sea coast was similarly defended, and even that the unimportant harbors were torpedoed for miles at sea. Of course this was not the case, and torpedo experts know that it would be impossible to do it. On the other hand, although the Turks had but a few five-hundred-pound electric mines, and nothing else, in the harbor of Batoum, and a few similar ones at Sulina and at the mouth of the Bosphorus and Dardanelles, they were supposed to have a great many more, and much fewer offensive torpedo attacks were attempted by the Russians than would otherwise have been the case, and they made no use of their ships whatever, except in the much-disputed case of Captain Barouroff.

Of the second class of torpedoes—the movable ones—there are many varieties. The first and most primitive, though by no means the most unimportant, are drifting or current torpedoes. They are simply cans or boxes of explosive material fitted with contact fuses, and are usually made fast to a block of wood so as to hang a few feet below the surface. They are placed in the current of a river, above where an enemy's ships are lying, and allowed to drift down upon them. During our war they destroyed several vessels, and were such a continual source of annoyance as to lead to the adoption of nets suspended from the ends of spars rigged out when the vessels were at anchor, as a protection against them. They have always been a favorite species of "tormentor" with us from the date of the "battle of the kegs," which was occasioned by one of Bushnell's inventions, up to the end of our late war; but neither the Russians nor Turks made any use of them, though it might have been supposed that the Danube would have been an advantageous field for their operation. From their very nature, however, they are not capable of much scientific development, and consequently are less likely to receive attention in time of peace than those species which, being directly under the immediate control of an operator, are more certain of success, although there is, in many cases, greater personal risk of injury from the enemy in handling them.

This consideration brings us immediately to the spar-torpedo, or "bag of powder on the end of a pole," as it is sometimes rather jeeringly termed. It was the spar-torpedo that enabled the gallant Cushing to destroy the "Albemarle," the most formidable ironclad in possession of the Confederates; by this means, too, the Confederates destroyed the "Housatonic," and the Russians destroyed the Turkish monitor "Duba Saife." Cushing had an ordinary steam-launch with a spar, to which was attached a torpedo, carried on the gunwale of the boat. By pulling on one line the spar was rigged out ahead of the boat through a kind of rowlock on the bow, the end with the torpedo dropping into the water as the spar went out; by pulling another line the torpedo was detached from the spar, and, having an air-chamber in it, it rose under the overhanging armor-shelf of the "Albemarle"; by pulling another line the torpedo was exploded and the "Albemarle" sunk. Since that date great improvements have been made in the spar-torpedo, and even quite large tugs have been fitted with hollow iron spars from eight to twelve inches in diameter, made to run out by machinery, and carrying a torpedo at their ends, the electric wires of the torpedo passing through the spars to the operator on board. The possibility of constructing a torpedo vessel of any great size capable of indefinitely enduring the shock of discharge of its own torpedoes, on both bow and sides, and at the same time of carrying a heavy gun at sea, has been successfully demonstrated in the U. S. S. "Alarm," an iron vessel, one hundred and seventy-two feet long, of three hundred and

eleven tons. She is armed with three torpedo-spars and a fifteen-inch gun, and is constructed with a double skin. She has five-inch plate on the bows, and is fitted with a "Fowler wheel," a very ingenious apparatus, by which the vessel is both propelled and steered. The handiness and quickness of turning of the vessel is most extraordinary, but the engine is only capable of driving the wheel fast enough to obtain a speed of nine knots, which is entirely inadequate, and changes are now being made both in the engine and means of propulsion. The advisability of using any vessel larger than a launch for spar-torpedo work is extremely doubtful, although the English and Russians are now constructing several of over one hundred feet in length, and capable of going to sea. The larger the vessel the larger the mark for the enemy to shoot at, and since with the increased size there is increased weight, the attacking vessel would probably prove more efficient as a properly-constructed ram on the American principle, armed with a very heavy rifled gun capable of firing flat-headed projectiles at extreme depression. At present all the sea-going vessels of the U. S. navy are fitted with wooden torpedo-spars, shackled to ring-bolts in the ship's side abreast the masts. They are supported by topping-lifts and forward- and after-guys, the forward-guy being a wire rope. It is needless to remark that, in addition to the danger of these supports being shot away in action, the shock to the hull and engine of a vessel not specially constructed for this work is apt to be dangerous.

The principal efforts, however, have been directed towards the perfection of launches, and the contrast between the primitive apparatus used by Cushing and the complete appointments of a modern launch constructed by Herreshoff (American), Yarrow or Thorneycroft (English), or Schibau (Prussian), is very great. The speed is nearly trebled, steam can be raised in one-tenth the time, the noise is much diminished, the spars are worked by machinery, the explosive is quintupled. Mechanical fuses are replaced by electric, and the boat, which was open, is now covered, or nearly so. Still, as a weapon of war, it is but replacing a stick with a sword. You must get within arms-length of your enemy to use it, and the dangers to be encountered are considerably greater now than formerly, and especially is this the case with ordinary ship-launches, which must be used for other purposes as well as for torpedo work, and consequently are not covered. The dangers that are referred to are the easily appreciated one of being shot at on approaching, and the comparatively unappreciated one of the effect on yourself of the explosion of your own torpedo. Most experiments are made with launches when they are still, or only going at a low rate of speed. In the open water, the effect of the explosion of an ordinary torpedo of seventy-five pounds of powder, at eighteen feet horizontally from a boat, and ten feet deep, is quite peculiar: there is a sharp shock as though the boat had been

struck on the bottom a double blow with a heavy hammer; a huge hill of water is raised in front, on which the bow of the boat is lifted bodily, and from this position she slides backward so rapidly that not a great deal of water falls into her. The experiment of firing a torpedo with a launch going at full speed, and rushing directly under the column of water, is not known to have been tried. Neither has that of blowing up a vessel when at full speed. The first experiment has been tried in the "Alarm" with impunity; but she is very large compared with a launch, and her full speed is less than half that of a Yarrow or Herreshoff. It is evident in the case of blowing up a vessel that nearly all the force of the explosion that does not go through the vessel will go towards the attacking launch, and the quantity of water falling into or on her would be very great, besides being accompanied by the débris from the vessel. In the attack on the "Albemarle," Cushing's boat was sunk by it, and, except himself, the crew were either drowned or captured. The boat which destroyed the "Housatonic" was a submarine one, but used on the surface on this occasion, and not a soul survived, the boat being found after the war lying opposite the hole her torpedo had made, and containing nine skeletons. The Russians in their attacks on the Turkish vessels experienced like difficulties. In three attacks with spar-torpedoes, one only of which was successful, two of the Russian launches were sunk, though it was never known *certainly* whether it was due to the torpedoes themselves or to the fire of the Turks, and it is not known how many people were drowned.

To avoid this danger various expedients have been devised in different countries whereby the torpedo-spar can be pivoted so as to swing round in the arc of a circle and strike the vessel as the attacking launch steams past. This, of course, would require much greater skill as to judgment of distance, time, etc., while the shock to the boat is worse. In ordinary parlance the theoretical attack of a torpedo-boat is to "rush towards the enemy at a speed of twenty miles an hour; when in close proximity she is to slow down and run out her spars armed with the deadly torpedoes, and then under full headway dart alongside the vessel and destroy her." Now, as a matter of fact, a spar in the water in front of a light boat decreases her speed enormously, which of itself is a very grave matter, and the "Albemarle," for instance, was protected by a huge boom of logs lying side by side like a corduroy road, and no torpedo handled in that fashion would *ever* have reached her. Cushing ran bows-on to the boom directly in front of the muzzle of a huge Brooke rifle, and *then* ran out his spar *over* the boom and into the water. It was a race as to whether the torpedo or the gun could be fired first, and so far as he could tell they both went off together. At any rate he found himself in the water, and always supposed that the shot from the gun had sunk his boat until she was raised after the war and found to be uninjured.

As regards being shot at, on approaching the enemy, it cannot be denied that in the same manner as heavy guns have finally been constructed superior to any armor afloat, so have torpedo-guns progressed faster than spar-torpedo-boats. In the popular language during the Cuban troubles, "our mosquito fleet of torpedo craft would attack the ironclad dons in swarms." Undoubtedly we would; but a big fellow that is throwing ounce and pound balls at you at the rate of thirty to one thousand per minute from Gatling, Hotchkiss, and Nordenfeldt guns, is not a comfortable thing to swarm on by the most enthusiastic of bees, and the very busiest of the swarm can only advance a mile in two and a half minutes by the fastest torpedo-boat yet constructed, a Yarrow making 24.5 miles per hour. The true field of operation for the spar-torpedo-boat is in a complete surprise, which cannot always be relied on, although an experiment made for that special purpose by the Germans in Kiel on a very dark night during the Franco-Prussian war, demonstrated that in spite of their utmost vigilance, without resorting to booms, guard-boats, and electric lights, a lead-colored, noiseless torpedo-boat was able to come directly to the gangway of their largest ironclad without being observed. Two attacks by the Prussians, besides those mentioned, were attempted in broad daylight, and in neither case did the boats get near enough to even attempt to use their torpedoes. One of the boats used was a very fast, completely-appointed Thorneycroft torpedo launch; her commanding officer and the next in rank were both severely wounded, and worse than all, the electric wires of the torpedo were cut by a ball, and the boat's only weapon of attack thus rendered useless.

Hitherto attempts to blow up vessels by means of spar-torpedo-boats have been considered at best as forlorn-hopes and reckless adventures on the part of those undertaking them. Undoubtedly we would have no difficulty in future wars in obtaining volunteers among our officers, aided by plenty of reckless men who would offer their services. For both there would be honor and prize-money if successful; but, as I heard an English naval officer remark the other day, "we do not want to depend on reckless men or rely on a weapon that requires their services; we want a weapon that we can *order* men to use, and in the use of which there is at least a reasonable hope of some other fate than self-destruction." It is these considerations that have spurred ingenuity in the direction of radical changes in the means employed for applying the torpedo, and have led to the production of the Harvey, or towing, the Whitehead, or projectile, and the Lay, or controllable systems, all of which have come into notice since our war.

Every one who has seen a kite flying knows how it will rise when the small boy runs away with the end of the string, and how it will dive if the string is suddenly let go. Transfer the kite to the water and imagine it flying *horizontally* from a boat or ship, and you have

the Harvey torpedo, the invention of Captain Harvey, of the English navy. The kite is a box containing from sixty to one hundred pounds of explosive, and the tail consists of two cork buoys strung on a rope in rear. The ship or boat, steaming rapidly ahead with the end of the line, causes the torpedo to sheer out to an angle of nearly forty-five degrees with the path of the towing ship, the distance being regulated by the length of the line. By slacking the tow-line suddenly the torpedo will dive, and by holding fast the line after slacking it will rise under the bottom of the vessel attacked and explode on contact. This system was quite popular at first, and Harvey's own pattern was adopted into the Russian, English, and United States navies, while other nations, particularly the French, Danes, and Germans, made important changes in the form of it. Experiments have also been made in the United States, and a great variety have been produced, some with tails and some without, some to go always on the surface with the charge to drop on striking, and some to go always at a certain depth. The tow-line has also, in some cases, been made electric, and the torpedo thus rendered safer; but the defect of all of them lies in the system itself, and they not only require extraordinary skill and judgment in the handling, but one is in constant danger of being "hoist by his own petard" with most varieties in consequence of their tendency, particularly in a heavy sea, to capsize and come towards the towing ship. It is difficult to use them in a night attack with boats, as the distance cannot be correctly estimated, and more than two boats cannot be used in attacking the same ship. Two attempts were made during the Turco-Russian war to use this species of torpedo, and both failed. The first time the torpedo was well placed directly under a large Turkish transport, but failed to explode. In the second case the cable fouled the launch's own propeller, and she was compelled to return before getting within range of the enemy. A few months ago all Harveys in service in the English navy were ordered to be "turned into store," and it is probable that in that country little more will be attempted with them; but the French still continue to arm their heavy ironclads with a towing torpedo having a dropping charge. One of these torpedoes is carried on each quarter, and on going into action they are to be towed astern, so that if during the fight the enemy can be outmanœuvred and brought under the stern, or if he goes there of his own accord to obtain a raking fire, they may be used.

We now come to the Whitehead, or projectile system, which, as the name indicates, is a method of throwing or discharging the torpedo under water. Avoiding at once the obvious difficulties of obtaining anything like a great range with an ordinary gun projectile, Mr. Robert Whitehead (an Englishman living at Fiume, in Austria) conceived the ingenious idea of constructing a large cigar-shaped projectile or fish, which should be discharged through a tube under water by a charge of

compressed air behind it, the cigar being able to continue its motion by means of a small propeller driven by a compressed-air engine *inside* it. To many the idea did not appear practical for many years, but the ultimate result has been that the different nations of Europe, seeing the obvious necessity of a submarine projectile of some kind, have expended more money on the Whitehead than on all other torpedoes combined. Their cost is about nineteen hundred dollars apiece; but a purchasing nation must pay down from thirty to forty thousand dollars for the right to use it, and those instructed in its use are sworn to secrecy as to its peculiar construction. Nearly every nation in Europe has become a purchaser, and Mr. Whitehead's manufactory is said to be turning them out at the rate of five hundred per year. Most nations have merely bought the invention from Mr. Whitehead, with his successive improvements, but in England the right to manufacture was also obtained; and the weapon has been improved at Woolwich until results have been reached which are certainly remarkable. The "Woolwich fish" may be briefly described as follows: It is a cigar-shaped boat, from fourteen to eighteen feet long, and from fourteen to sixteen inches in diameter. It contains an explosive charge of forty to sixty pounds of gun-cotton in the bow; an air reservoir, in which is a supply of air compressed to a pressure of fifteen hundred pounds per square inch; a three-cylinder engine, which receives the air at a pressure of eight hundred pounds per square inch, and exhausts it at three hundred pounds. This engine weighs only thirty-five pounds, and will exert sixty horse-power. There is also a hydrostatic apparatus, termed the secret, for regulating exterior rudders, by which the torpedo is enabled to run any depth which may be desired. It is driven by two propellers working in opposite directions, and it attains the enormous speed of *thirty miles per hour* for a distance of eight hundred yards, though it will run a mile at over fifteen miles per hour. Lateral rudders are also attached, which can be fixed at any angle. The methods of discharging the implement are various. It can be driven from a tube under water, it can be dropped from a vessel's rail into the water, or it can be let off from a frame over the side of a small boat. Great difficulties are experienced in discharging it from the broadside when the attacking vessel is going at full speed, either from below the water or above, the result being loss of direction on the part of the torpedo, or fouling the propeller of the ship. At present a frame is used over the side, like the paddle-wheel of a steamer; when wishing to fire, the frame is revolved in a direction contrary to the motion of the vessel, and the torpedo is started the moment it touches the water. With the immense speed attained, an unexpected result has become manifest; the rebound is so great and so rapid on striking a hard object that there is great danger that no fuse will act quickly enough to fire the explosive charge when in contact with the enemy,—a condition which is very

essential. This difficulty can be overcome, but the radical defect of the implement—and it is the defect of any projectile—is that after having left the hand of the operator it is uncontrollable. For harbor defense this defect is vital. No matter how delicately rudders may be adjusted, they have found in England that even with the present speed the torpedo is unreliable in an irregular current or tideway, and they are now endeavoring to attach an electric wire to it,—that is, to convert it into a torpedo on the Lay system, which will be described farther on.

In the German experiments at Kiel last fall, two Whitehead torpedoes were exploded against a vessel. Each made a large hole, and either would have destroyed her; but the distance chosen, so as to be sure and strike the object, was only between six and seven hundred feet, although the implement was possessed of much greater range. There is no doubt, however, that when used in actual warfare by *intelligent operators* the Whitehead will prove a terrible weapon. All European nations appear to realize this, and England has over twenty sea-going cruisers and large numbers of launches fitted for its use, while Italy has gone so far as to fit tubes for their use in those enormous ironclads the "Duilio" and "Dandolo." So far but three attempts have been made to use the Whitehead in warfare, only one of which was successful. The first attempt was by the English man-of-war "Shah" against the pirate "Huascar," but the torpedo was one of the earliest type, and did not possess nearly the speed of the "Huascar." The other two attempts were made by the Russians, and it is a significant fact that of the eight attacks made with offensive torpedoes in their war, the last two were made with Whiteheads alone. The first attempt, which was on the night of December 27, 1877, was a failure, and the accounts are somewhat conflicting. It seems, however, that the Turkish fleet was lying in the harbor of Batoum, protected by guard-boats and a boom of logs, to which were attached boards, kept upright in the water by means of weights. The night was extremely dark, and when at a supposed distance of sixty or seventy yards three torpedoes were discharged. One of them struck the admiral's vessel (an ironclad), one struck the mooring-chain of another vessel, and the third hit nothing. No explosion was heard from any of them, but two were found on the beach in the morning, one with its fore compartment knocked entirely off, and the other perfectly intact, *with its safety-pin still in place.* It is probable that the safety-pins had never been removed from any of the torpedoes, for both the ship and the chain were struck hard enough to polish the point of impact. The Turks thus obtained the secret of the Whitehead without purchase. The second attempt of the Russians was on the night of January 25, 1878, but this time the two attacking boats met a Turkish revenue vessel on guard at the mouth of the harbor. Two torpedoes were discharged at a distance of seventy to ninety yards, and the vessel was instantly sunk, the noise of the

explosion arousing the squadron inside and preventing further operations.

It is believed that neither Chili nor Peru are in possession of the Whitehead, so that no results can be looked for in that quarter.

Very little has been done in experimenting with submarine guns, properly so called, or submarine rockets, though there is undoubtedly a large field, and a fruitful one, for both. Captain Ericsson is at present making some interesting experiments with the "Destroyer," a fast vessel of his invention, lying very low in the water, so as to present a small target to the enemy, and fitted with a tube in the bow, below the water-line, from which he discharges, by means of compressed air, a huge bolt some twenty feet long. His final results are not known, though he had succeeded some time ago in driving it some two hundred feet at a velocity of sixty miles per hour. It is probable that experiment in this direction will eventually produce a much smaller projectile driven by gunpowder, which, with a range of even one hundred feet, will be able to take the place of the present spar-torpedo.

During the early part of our war some experiments were made with a species of rocket by Major Hunt of our army. They were of different dimensions and construction, the average size being about six feet long and one foot in diameter. His experiments were unsatisfactory, and were prematurely brought to a close by the unfortunate death of the major from suffocation through the escaping gas of one of his implements. Since that time no experiments have been made on a large scale, although Mr. Weir, of New York, has been remarkably successful with some small-sized water-rockets of peculiar design. Experiment in this direction will be found quite expensive, as, indeed, has been the case with every other implement that has tended to improve the science of destruction; but it offers theoretically the most favorable field for the production of a weapon which will supersede the Whitehead in its use from ships and boats. It has never been found possible to make the rocket a weapon of accuracy in the air, for the simple reason that through the consumption of the composition the implement is continually growing lighter and the position of the centre of gravity is constantly changing. In the water the consumption, of course, takes place, but here we have the rocket traveling in a medium which is nine hundred times as dense as air, and by so constructing the rocket as to take in, through appropriate apertures, a quantity of water equal in weight to the composition consumed, and in proportion as that consumption takes place, we remedy entirely those difficulties which in the air are insurmountable. A water-rocket seven feet long and one foot in diameter would carry at least forty pounds of explosive in its head, and such a weapon could be stowed on board ship as ordinary shell are now stowed, and would require no more care than they do in the handling, while the delicate machinery which is necessary in the Whitehead

to maintain its locomotion requires constant care and the attention of the most skillful mechanics when it is desired to use it.

The last variety of movable torpedoes is the Lay, or controllable system, by which is understood a locomotive species of torpedo at all times under the control of the operator after it has left his hands. There are but three varieties of this system that have yet been produced: the first in which control is effected by means of lines attached to a rudder, the second by compressed air, and the third by electricity. Of the first it is only necessary to remark that the lines become twisted and will not work. The second method is the invention of Captain Ericsson, whose torpedo is a box-shaped wooden vessel about fourteen feet long by eighteen inches wide and three feet deep. In its interior is an air-engine, a hydrostatic apparatus for diving rudders, and an air apparatus for steering rudders. It is driven by two propellers, and the power is communicated by compressed air forced from shore through a rubber tube 1.5 inch in diameter, which the torpedo drags behind it, the rudder being affected one way or the other by a greater or less pressure of air. With this torpedo a range of six to seven hundred feet has been obtained (the total length of the tube), and a speed of about four miles per hour. A greater range could undoubtedly be obtained, but the difficulties of perfecting an apparatus of this description into a practical weapon are obvious, and the use of electricity affords a readier solution of the problem in question. With the electrically-controlled torpedo Colonel J. L. Lay, of Buffalo (the inventor of the spar apparatus used in the sinking of the "Albemarle"), has been the earliest inventor and the most indefatigable experimenter. Practically the Lay torpedo is a controllable Whitehead, with greater range, but without the speed. Generally speaking, it is a cigar boat twenty-two feet long by twenty-two inches in diameter. It contains one hundred pounds of explosive, a reservoir of liquid carbonic acid, a coil of electric cable, a gas motive-engine, an apparatus for steering, and another for raising or lowering two guide-rods, all the machinery being fitted with electrically-controlled valves. It is driven by a propeller on a hollow shaft through which passes the end of the cable to the shore. By means of an electric battery at the shore end of this cable the torpedo-engine can be started or stopped, the rudder put to starboard or to port, the guide-rods raised or lowered, and the explosive in the bow of the boat fired either by contact with the enemy or at will of the operator, the cable being paid out from the torpedo as it advances through the water. The ordinary boat will run 1.25 mile at a speed of nine miles per hour, but the range is only limited by the amount of cable, as the larger the boat to contain the cable the greater amount of gas it can carry, and some have been made with a range of 2.5 miles. It has been found that compressed air will not give the great range that is desirable to make this weapon useful for harbor defense, and liquid

carbonic acid contains more power to the pound than any other chemical yet found available; but it is the heavy nature of this material when in a gaseous form at a low temperature which renders it difficult to work through an engine, together with the friction of the cable in paying out, that has so far prevented the attainment of the Whitehead speed. The Lay torpedo floats with its upper part just at the surface, and when in motion is covered with a slight ripple of water; the guide-rods, which rise to a height of four or five feet and carry hooded lamps at night, serving to guide it. It can be fitted with automatic apparatus to cause it to run entirely under water at any depth like the Whitehead, but great difficulty is already experienced in seeing it when at a great range, and it is not at present deemed advisable by the inventor to so adapt it. There is no doubt but that one hundred pounds of dynamite would, even at the water-line, crush through the side of the strongest ironclad ever constructed, but as no experience has actually demonstrated this point the ordinary torpedo is constructed with an automatic arrangement, whereby the whole explosive compartment is made to drop a distance of six feet under water on coming in contact with the enemy and there explode by electricity.

In the Lay torpedo both the sciences of electricity and chemistry have been brought to bear to accomplish results which are beyond the reach of mechanics. It has consequently taken a longer time to develop it than it has the Whitehead, and here, too, we meet with the uncomfortable items of expense continually rising in the scale as we approach nearer the submarine weapon which shall overcome all theoretical objections. The Whitehead has cost over one hundred thousand dollars to develop it, and the Lay over double that amount. As is evident from the nature of the Lay, even more intelligence and education are required to use it than the Whitehead, and the Russians have recognized this fact in establishing a school and a manufactory for the Lay, which is to be used extensively in the defense of Cronstadt and other Russian ports. A series of trials of the implement have lately been successfully carried out at Antwerp before a committee appointed by the Belgian government, the trials being largely attended by representatives of other nations, who were very much impressed with the remarkable evolutions and perfect controllability of this "Yankee notion." In the United States experiments have been made with it for several years, the opinions as to whether it is too complicated or not for a practical weapon being very much divided.

The Lay at its only trial in actual warfare has failed, and for the same reason as did the Whitehead on its first two trials,—a lack of intelligence on the part of the operators. One was on board the "Huascar" in one of her successful raids on the Chilian coast previous to her capture. At early daylight a Chilian transport was sighted at anchor, and the "Huascar" approached within six hundred feet, as the

crew were all asleep. The torpedo was lowered into the water and successfully started, but suddenly the rudder, for some unknown reason, became jammed, the torpedo turned a complete circle and came back, passing under the stern of the "Huascar." Comment is needless. It may be added, however, that, according to the New York *Herald* correspondent, it was the fear of the Lay torpedo which caused the Chilian fleet to suddenly raise the blockade of Arica during the early part of the war after having closely invested that port for some time.

It is evident from what has been stated with regard to the value of electricity in controlling torpedoes of the Lay system, that the ultimate result of experiment in that direction will be a torpedo which is worked entirely by electricity, without the intervention of any compressed air or gas whatever. Mr. Bridges, of New York, and probably others, have been working in this direction, and there is no doubt whatever of ultimate success, although it may be some distance in the future. At a recent trial of the Bridges torpedo at Willet's Point, the implement ran a distance of four thousand feet at a mean speed of 8.8 miles, and a maximum speed of ten miles per hour, being perfectly under control during the time,—a most flattering result, considering that its entire motive-power was derived from a dynamo-electric machine on shore.

Whether the speed of a Whitehead or a Rocket will ever be obtained by a torpedo on the Lay system is exceedingly problematical. The drag of the cable, even though paying from the boat as freely as possible, will always be an important obstacle, and if the strain is very great the cable itself cannot be made to endure it; but at the same time it is also a question whether, for harbor defense, this enormous speed is essential. Vessels do not usually go at full speed in entering port unless the channel is long and straight, and once inside an ordinary harbor to manœuvre at full speed is impossible. Of course smaller specimens of the Lay system will be adapted to use from ships, but the true field for its application is in coast and harbor defense, and here it possesses four great advantages over fixed mines, or at least qualifications which supply their deficiencies: First. It goes *to* the enemy instead of waiting for the enemy to come to it. Second. However complicated it may be in construction, you at least have it on shore, where it can be kept in order until it is actually wanted. Third. It can be transported from place to place along the shore as exigency may require. Fourth. It can be used in harbors, straits, and rivers, where it is either physically impossible to plant any fixed mines at all, or where there is no time to plant them. Besides the foregoing there are other theoretical advantages of the Lay system, but they pertain more particularly to use by an attacking force in the clearing away of fixed mines. It would be theoretically possible, for instance, to send such an implement into a harbor, turn it round and drop a grapnel, the

rope of which it would bring back to a tug in waiting, which could then, by hauling on the rope, cut any wires which might be caught by the grapnel. These considerations are, however, remote from the main use of the weapon, whose primary object is to destroy ships.

The subject of submarine boats has not been heretofore touched upon except in the description of Bushnell's apparatus, because, notwithstanding their manifest advantages in the way of secrecy, they have so far labored under two insuperable disadvantages,—the lack of any sufficient artificial light and the lack of speed. All the other difficulties (and they are many) have been practically overcome in the best invention of this kind which is known to exist, that of the late Mr. Phillips, an ingenious shoemaker of Michigan. His boats were cigar-shaped, from thirty to sixty feet long and four to eight feet in diameter. Compressed air was "put up" in a number of large iron tubes before descending, and they supplied the means of doing almost everything. The boat could be sunk to any depth and maintained at that depth, and also kept horizontal in the water by a series of most ingenious automatic arrangements. He purified the air after breathing it by forcing it through water, and thus ridding it of carbonic acid and other impurities. So successful was he in this that he was able to stay under water with three or four other people for twenty-four hours, although he had no means of supplying oxygen. He sunk a small vessel by means of a small 6-pounder gun which he had mounted in a ball-and-socket joint in the top of the boat, and a rocket arrangement was devised for towing a small torpedo, but is not known to have been tried. The bow of the boat was fitted for using a number of saws, chisels, etc., and was surrounded by glass plates, so that obstructions could be seen and removed, and it is said that he made a practical demonstration of the utility of this arrangement by cutting the piles from a neighbor's wharf. He also proposed to anchor his boat and remove obstructions by means of a diver, who passed out through a door in the bottom, the water being kept out by the pressure of the air in the boat. The speed of the boat was not, however, greater than two miles per hour, and the lantern which he had constructed did not give sufficient light. Mr. Phillips was unfortunately drowned a few years ago near Buffalo by, as is supposed, the crushing of his boat at great depth; but had he lived, it is difficult to say what he might not have accomplished in the way of propulsion and light. He had already devised a steam-engine the coal fire of which was to be fed by compressed air, and the smoke of which was to be forced into the water; but this arrangement was never tried, and would possibly have heated the boat to an unendurable degree if it had been; still, he might have produced something useful, and as it is, the field is still open for other inventive spirits.

In conclusion, it may be remarked that the old adage of not putting

all your eggs in one basket is as applicable to harbor defense as to any other undertaking. Where torpedoes can be used, the moral effect on the enemy will always be very great. Fixed mines are admirable for keeping the enemy under the fire of the forts. The Lay system is a most valuable adjunct to both, and it is invaluable should the enemy get past the fixed mines, or should he attempt a landing where there are neither fixed mines nor forts. Specially fitted projectile torpedo-boats will always be useful, as they will allow the sea-going vessels to be spared from coast defense. But nature in some cases seems absolutely determined that no species of torpedoes should be used. In Holland, for example, with the most tremendous tides and tidal currents, a muddy water and a wretched bottom for the confusion of the advocate of fixed mines, they have, in addition, masses of sea-weed from two to four feet thick, moving on the surface with every tide for the special demoralization of movable torpedoes; and again, on most parts of the bold coast of Peru and Chili, with deep water and a tremendous surf, it is almost impossible to operate any kind of torpedo from the shore. Our own country, however, from the shallowness of its harbors, the great extent of its sea-coast, and the comparatively moderate tides, offers superior advantages for the employment of all kinds of torpedoes to assist its ordinary means of defense; but they can only assist after all. As long as foreign nations build ironclads, and there is not the slightest evidence that they intend desisting from this unkind practice, we must have guns that will penetrate them, and ironclads and fortifications to use the guns from. General Abbot, at the army torpedo station at Willet's Point, has perfected a system of mines that is probably unequaled in the world. A complete plan of mine defense for each of our great harbors is already "on file," and a considerable amount of material is ready. It is the offensive system of torpedoes which is the most expensive to develop, however, and through lack of money the naval torpedo station at Newport has been able to do little more than prepare to accomplish something. Take, for example, the defense of a straight channel a mile wide, with moderate depth of water, —a most favorable case for the employment of numbers of fixed mines. There would, according to modern ideas, be three lines of mines across the channel, planted in groups of say four each, for simultaneous explosion, at a distance of about one hundred and fifty feet between groups, and there would be say thirty more outlying mines on either side. They would cost about one hundred and fifty dollars apiece, and an armored cable costs from two hundred and fifty to fifteen hundred dollars per mile, according to number of wires, quality, etc. Roughly, then, the mine defense, including electrical apparatus, would be about eighty thousand dollars. Now, the selling price of torpedoes on the Lay system, of which there should be at least ten, is from ten to fifteen thousand dollars apiece (though they could probably be manufactured for some-

thing less). Fully equipped, fast launches, armed with three projectile torpedoes each, would cost fifteen thousand dollars apiece, and there should be at least ten of these launches. If the defense were supplemented by large torpedo-vessels, like our "Alarm" or "Intrepid," an additional sum of three hundred thousand dollars would have to be allowed for each of these. It is evident from this comparison, which cannot be considered an exaggerated one, that offensive torpedoes and the means of applying them are much more costly than defensive ones, though at the same time the total cost of the torpedo defenses of such a channel would be no more than the price of a modern ironclad. This, however, it must be remembered, is only one channel, and that one very favorable for the use of fixed mines.

The popular method of estimating the relative value of torpedoes and ships is well exemplified in the case of the Peruvians, who only desired to purchase two Lay torpedoes, because the Chilians had but two ironclads, and the idea that we usually see expressed is that a fixed mine worth one hundred and fifty dollars will certainly effect the destruction of an ironclad worth one million dollars. It should always be borne in mind that a torpedo of any description can be used once, and no more, like the charge from a gun. The cost of such a charge is anywhere from five to five hundred dollars, and yet no one thinks of comparing that, or even the cost of the gun itself, with the cost of a vessel. If the ship came in contact with the torpedo she would be destroyed; but so she would if the shot penetrated her boiler or her magazine, and there are a great many more opportunities for using the gun than the torpedo. Moreover, suppose the torpedo has fulfilled its mission, there could then be no more fixed torpedoes in the same spot or within several hundred feet of it, and an energetic commander who would be willing to sacrifice several of his fleet, as Farragut was obliged to do at Mobile, could still make progress as far as the other fixed mines were concerned.

The importance of movable torpedoes is so manifest that nearly all the nations of Europe possess one or two large torpedo-vessels, and the number of small special craft, for Whitehead and spar torpedoes, that have been constructed by the firms of Thorneycroft and Yarrow in the last six years is something enormous. England and Russia possess them by the hundred, and every other maritime continental nation seems to be following rapidly in their footsteps. It is probable that there are not less than one thousand specimens of these and other builders' handiwork at present afloat in European harbors, and England is now sending them abroad to assist in the defense of her foreign possessions. Germany, as long ago as 1870, realized the necessity, and commenced building small craft to assist her submarine mines. In Copenhagen every private yacht and launch is provided with its torpedo fittings, which the government takes care of until they may be

needed. Sweden, one of the first nations to buy a Thorneycroft, is now experimenting in the propulsion of small torpedo-craft by hydraulic power. In France every engineer of the navy is obliged to receive a course of instruction in manipulating the Whitehead at the torpedo school at Boyardville. We only, the country which originated the torpedo, have but six or seven boats specially fitted for its application, even in its most primitive form. Ideas are as plenty as in any other field to which American inventive genius has turned its attention; but private inventors cannot afford to develop their ideas, and the government authorities have no money. A few "bags of powder on the end of a pole" and a few Harveys are supplied to cruising ships and their launches; but "our torpedo flotilla," which the newspapers were so fond of alluding to during the "Virginius" excitement, although a very desirable and necessary institution, was then and is now—a myth.

F. M. Barber,
Lieutenant-Commander U.S.N.

BENEDICT ARNOLD AT SARATOGA.

REPLY TO JOHN AUSTIN STEVENS, AND NEW EVIDENCE OF MR. BANCROFT'S ERROR.

In the March number of *The Magazine of American History*, John Austin Stevens publishes an article entitled "Benedict Arnold and his Apologist," reviewing the "Life of Benedict Arnold," made up largely of the abuse and gossip and loose traditions which have been floating through the press for a hundred years.

Those who desire to hear both sides, with a view of learning the exact truth, are referred to the book which Mr. Stevens reviews. My purpose now is to deal with a single error of Mr. Stevens, and if I demonstrate the error, the reader may, if he thinks proper, apply to the bitter and unfair article the maxim "*falsum in uno, falsum in omnibus.*"

Mr. Bancroft and some other American historians have refused to accord to a man so justly odious as Benedict Arnold the glory of fighting and winning perhaps the most important battle of the Revolution. He says, speaking of the battle against Burgoyne on the 19th September, "Arnold was not on the field" (Hist. of U. S., vol. ix. p. 410, text and note). To this statement Mr. Bancroft still adheres, and his position is fully presented in the following note:

"WASHINGTON, D. C., December 15, 1879.

"DEAR SIR:

"I send you agreeably to your request a copy of the whole letter of Chancellor Livingston to Washington. The draft of it, which I once had in my hands and copied, bears date the 12th January; the letter is indorsed in Washington's files as of the 14th January, 1778. You will see that the Chancellor's statement is very explicit, that Arnold was not in the battle of the 19th September, 1777. But what I look upon as still more conclusive is the statement of Judge Marshall after mature inquiry. In his first edition of the 'Life of Washington,' vol. iii. page 277, he says that Arnold was on that day completely 'engaged'; but the publication of this work brought to him the knowledge of his error, and in his second edition, vol. i. p. 201, he cancels his former statement, and gives the correct narration of the affair, with an explanatory note.

"The letter of Colonel Varick to Schuyler, written on the evening after the battle of the 19th September, 1777, is in harmony with the corrected statement of Judge Marshall. There is not a single word in the letter which asserts that Arnold himself was engaged.

"Yours truly,

"GEORGE BANCROFT.

"HON. ISAAC N. ARNOLD."

Mr. Stevens reiterates the charge of Bancroft, but neither refutes the evidence showing its untruth, nor produces any additional evidence to sustain it. I make the issue directly with these gentlemen. I declare "that Arnold *was* on the field; *was* actively engaged in the battle of the 19th of September, 1777," and that his services on that day and in the battle of the 7th October contributed largely to the capture of Burgoyne and his army; and I will try to prove my assertions.

I think I shall demonstrate that the misstatement of Wilkinson misled Marshall, and that the letter of R. R. Livingston to Washington is not inconsistent with the fact that Arnold was on the field and actively engaged in the battle of the 19th September.

Since the publication of my "Life of Benedict Arnold" I have received much and conclusive evidence showing the mistake of Mr. Bancroft and of Mr. Stevens in alleging that he was not on the field and did not participate in this battle. Among other pieces of evidence is the following letter from Colonel Varick, written to General Schuyler on the evening of the 19th, the day of the battle. This letter, it is proper to say, is not now among the Schuyler papers in the possession of the family of General Schuyler, and was not known to me until my attention was called to it by Mr. Bancroft. I immediately addressed a note to George L. Schuyler, Esq., the grandson of General Schuyler, and in whose custody the Schuyler manuscripts are, asking him to examine, ascertain, and advise me if he possessed such letter (because if he did I had overlooked it), and whether he knew of the existence of such a letter. In his reply he stated that he had seen such letter, and that it had been in his possession, but that he knew not what had become of it. Thereupon I wrote to Mr. Bancroft, who very kindly furnished me with an extract from it. I have not been able to learn where the original now is. The following is the "extract" furnished me by Mr. Bancroft:

"EXTRACT.

"*Colonel Richard Varick to General Schuyler.*

"CAMP NEAR STILLWATER, September 19, 1777.

"MY DEAR GENERAL:

"I have till this time detained Staats with a view of giving you some material intelligence what I shall do in the sequel as fully as the time I have and the circumstances of our situation will admit.

"Just after Lansing left us at 1½ o'clock, the enemy fired a field-piece about one and one-quarter of a mile to the north of General Arnold's camp; and the general being informed of the approach of the enemy, ordered out Colonel Morgan's corps of riflemen and infantry, who soon fell in with the enemy, and brought in some prisoners, and beat the enemy off the field. About three-quarters of an hour thereafter, the genl's received intelligence that the enemy were coming down through the woods in two divisions. Colonel Cilley's battalion was ordered out on a clear ground about a mile north, and shortly thereafter Scammell's, to flank the enemy on the left. It so happened that Scammell fell in with them, and Cilley

flanked them. These gentlemen, among others, behaved heroically, like veterans indeed. The enemy engaged us, and a very warm battle was fought, the enemy having two field-pieces. The riflemen, commanded by Colonel Morgan, behaved well and took a field-piece. The colonel had his horse killed under him. At 3, Colonel Cook's regiment of militia was ordered out. At about 4, Colonel Courtlandt was ordered to support them. At 4½, Colonel Livingston was ordered on the right of the enemy; both these soon fell in with and furiously attacked the enemy. At 5, General Learned was ordered out from our western picket on the high ground to attack the enemy and surround them. The general marched up with intrepidity, and his men soon encountered the enemy, and a very *capital* battle was fought, with great gallantry and heroic spirit on both sides, and with alternate success; they took a field-piece from the enemy; our riflemen not knowing how to manage it lost it again, and it was frequently taken and retaken. We drove the enemy four times, and they drove us in turn, till night, when we drove them from their works, thrown up in the woods, and retreated safely for want of ammunition. On this, I may say, *general* action (as almost the whole of Arnold's division except James Livingston's regiment were engaged) against between two and three thousand of the enemy's best troops, our troops behaved gallantly.

"In this action (Major Livingston being sent out with orders) remained a spectator till the close. I had the pleasure of seeing it for about an hour, as Major Clarkson and I accompanied Colonel Morgan, till reinforcements were wanting, when I was sent off. Every regiment that was ordered out had a share of the battle, which continued without intermission from two till half-past six."

Of this letter Mr. Stevens, after saying, "The letters of Major Livingston, quoted by Mr. Arnold, contain *no proof* that Arnold was on the field," strangely adds, "and there is still extant a circumstantial account of the action written on the day of the battle by Major Varick to General Schuyler, which makes *no mention of Arnold's participation* in the fight;" and Mr. Bancroft in his note to me, above quoted, dated December 15, says, speaking of this letter of Varick, "There is not a single word in the letter which asserts that Arnold himself was engaged."

Let us see. Varick, the aide of Arnold, on the evening after the engagement, writes a "letter to Schuyler giving a circumstantial account" of the events of the day, saying, "The general [Arnold] being informed of the approach of the enemy, *ordered* out Colonel Morgan's corps of riflemen and infantry," etc. "About three-quarters of an hour thereafter, the *genl's* received intelligence that the enemy were coming down through the woods in two divisions. Colonel Cilley's battalion was *ordered* out on a clear ground about a mile north, and shortly thereafter Scammell's, to flank the enemy on the left."

By whom were these orders given? "The general [Arnold] being informed of the approach of the enemy," orders Morgan, Cilley, and Scammell to their several positions on the field.

"At 3, Colonel Cook's regiment of militia was ordered out. At about 4, Colonel Courtlandt was ordered to support them." By whom?

Colonel Philip Van Courtlandt says that after he had left his parade and was marching toward the enemy, he *received his orders from General Arnold:* "My regiment was ordered to march, keeping to the

left, and in order to oppose their [the enemy's] right. This order was given me first by General Poor on my parade, and as I was marching *by General Arnold.*" (*Mag. of Am. Hist.*, May, 1878, p. 286.)

"At 4½, Colonel Livingston *was ordered* on the right of the enemy."

"At 5, General Learned *was ordered* out from our western picket on the high ground to attack the enemy."

Who gave these orders? Gates was out of sight, from one to two miles in the rear, and it is conceded by everybody, including Mr. Bancroft, that he gave no orders except to direct Arnold "to send Colonel Morgan and the light infantry to support him," and had nothing further whatever to do with the battle. Arnold was second in command, commanding the left wing, which was attacked. Here is an account of the battle, written in the camp on the field on the evening of the day of the fight, giving "a circumstantial account of the action."

After saying that "the general [Arnold] being informed of the approach of the enemy ordered out Colonel Morgan at 1.30. Three-quarters of an hour thereafter, that is, at 2.15, he orders Colonel Cilley, and then Scammell; at 3, Colonel Cook, and at about 4, Colonel Courtlandt (who himself says he received orders from Arnold in person); at 4.30 Colonel Livingston, and at 5 General Learned, receive orders!"

And yet Mr. Stevens says, "Varick makes no mention of Arnold's participation in the fight!" And Mr. Bancroft says, "There is not a single word in the letter which says that Arnold was engaged!"

What does Mr. Bancroft mean when he says that Arnold was not himself engaged; that he was not on the field?

This letter shows that Arnold gave every order and directed every movement. In his report of the battle to Gates, Arnold says, "On the 19th, when advice was received that the enemy was approaching, I took the liberty of giving my opinion that we ought to march out and attack them. You desired me to send out Colonel Morgan and the light infantry *and support them.*"[1] "Before the action was over *I* found it necessary to send out the whole of my division to support the attack." How, if not engaged and not on the field, did he find it necessary in supporting Morgan to send out his whole division? And how could he send out his whole division, giving orders to Morgan, and Cilley, and Scammell, and Cook, and Courtlandt, and Livingston, and Learned, directing each where and when to fight, and yet *not participate in the fight?*"

The charge of Bancroft and Stevens is obviously intended as a declaration that Arnold was guilty of neglect of duty, or something worse. Arnold's whole division was attacked, was engaged, but their leader was "not on the field and did not participate in the fight!" This charge is contradicted by the evidence, and was first made by

[1] Varick says, Arnold ordered out Colonel Morgan's corps of riflemen and the light infantry.

Wilkinson to rob him of the honor of that day, because of his hatred of Arnold, and has been repeated by those who were unwilling to see around the brow of a traitor the laurel of a gallant soldier!

If Mr. Bancroft means by saying that General Arnold was not engaged in this battle, that he did not lead a "forlorn-hope" of twenty-five men, as he did at Quebec, when he was shot down at their head; if he means that he did not with his own hands apply the "linstock" to the field-pieces, as he did when fighting the whole British fleet on Lake Champlain, when, having no good artillerymen on board, he himself fired nearly every gun with his own hands; if he means that he did not ride into the English lines, and that his horse was not shot down, as at the battle of Ridgefield, where his horse received thirteen bullets, and he killed with his pistol the grenadier about to run him through with his bayonet; if he means that he did not dash down between the British and American lines, firing at close quarters, as he did at the battle of the 7th of October, and as General Scott did at Lundy's Lane; if he means that he did not on this day lead a charge into the enemy's intrenchments, and receive a musket-ball shattering the bone of his thigh as his horse was killed under him; if all, or any one of these things are necessary before a general officer can be truly said to be "himself engaged" and "participate" in a battle, in this sense the statement and the charge is true. And it could be made with equal truth of Grant, and Sherman, and Hancock, or Washington himself, in the battles they fought. But if to issue every order, to direct every movement, to superintend every manœuvre, to watch and foil every movement of the enemy on the field from 1 to 6 P.M.,—if this is the proper duty of the commanding officer, and if to do this is to be "engaged" and "participate" in a battle, then Benedict Arnold was "engaged" and did "participate" in the battle of the 19th of September.

Judging from his conduct on other battle-fields, he would doubtless have preferred to have joined his old comrade and friend, Morgan, and have gone personally to the extreme front; but on this day he had the sole responsibility of command. Gates was far in the rear, and, as Varick says, did not wish to fight. And as to what sort of a soldier Gates was,—this ideal soldier of Stevens, who, he declares, was "the accomplished officer," "high-toned, magnanimous, etc.,"—I would refer Mr. Stevens to Mr. Bancroft, who says, "He had no fitness for command, and wanted personal courage." (Hist. of U.S., vol. ix. p. 407.) If, in the opinion of Mr. Stevens, Bancroft is infallible when he speaks of Arnold and Schuyler, I suppose he would be entitled to respect when speaking of Gates. I do not say Gates was a coward; that issue Mr. Stevens and Mr. Bancroft may settle between themselves. I do say he tried to supplant Washington, using as a means the success purchased by Arnold's blood, whose laurels he sought to steal. What sort of a soldier he was was illustrated at Camden. There Gates was disgrace-

fully defeated; but on that day General Arnold was not, as at Saratoga, between him and the enemy. General Gates was first heard from after that engagement sixty miles from the battle-field. Speaking of this battle, Bancroft says, "Gates was a petty intriguer, not a soldier," and he speaks of his running away from his army so fast and so far that he knew nothing of its condition. (Hist. of U. S., vol. x. p. 324.)

Before I present the additional evidence which has lately come to my knowledge in regard to Arnold's conduct at the first battle of Saratoga, I desire to call attention to the letters of Varick and Livingston, quoted in full in my "Life of Arnold." I have quoted the letter of Varick to Schuyler, written on the evening of the 19th of September, in full, or rather all of the "extract" from it with which Mr. Bancroft has furnished me.

On the 22d of September, Varick, in the camp and quarters of Arnold, writes again to Schuyler, saying, "Arnold has all the credit of the action" (of the 19th), and adds, "He [Gates] never intended to fight Burgoyne until Arnold urged, begged, and entreated him to do it."

Strange conduct! Arnold urges, begs, and entreats Gates to fight, and after the battle the soldiers give "Arnold all the credit of the action," yet we are told Arnold was not on the field and did not participate in the action!

Varick and Livingston, both of whom had been on Schuyler's staff, and when he was superseded by Gates remained in the military family of Arnold as staff-officers, in their letters to Schuyler, state many other facts utterly inconsistent with the idea that Arnold was not engaged in this battle. Among other things, Livingston, in a letter to Schuyler, dated September 22, says, "When the general officers and soldiers heard of it [Arnold's intention to leave] they were greatly alarmed. . . . They had lost confidence in Gates, and had the highest opinion of Arnold. To induce him [Arnold] to stay, General Poor proposed an address from the general officers and colonels of his division, returning him thanks for his services, and *particularly for his conduct during the late action*, and requesting him to stay. The address was framed and consented to by Poor's officers. Those of General Learned refused. They acquiesced in the propriety of the measure, but were afraid of giving umbrage to General Gates,—a paltry excuse for officers of rank to allege for not doing their duty. Finally, a letter was written to Arnold and signed by all the general officers, excepting Lincoln, urging him to remain, for another battle seemed imminent." We are asked to believe that the colonels and general officers who participated in and fought the battle of the 19th September prepared and signed an address to General Arnold returning him thanks, and "*particularly for his conduct* during the late action," and yet that he was not on the field and did not participate in the "late action" at all!

Major Livingston, in a letter dated September 23, written from

"Camp Bemis Heights" to General Schuyler, says, "Arnold's presence was never more necessary. He is the life and soul of the troops. Believe me, sir, to him alone is due the honor of our *late victory*."

And yet Mr. Bancroft says he was not on the field and did not participate in the battle in which this victory was won! Whoever sustains Mr. Bancroft in that assertion must attack the credibility of Colonel Varick and Major Livingston. And who were these young men who so triumphantly sustain the military conduct of Benedict Arnold on that eventful day? Colonel Richard Varick, after serving as staff-officer successively for Schuyler, Arnold, and Washington, was mayor of the city of New York and attorney-general of the State. Major Henry B. Livingston, as judge of the Supreme Court of the State of New York, and then justice of the Supreme Court of the United States, has left a judicial character above even a suspicion of the possibility of a misrepresentation.

Mr. Bancroft has kindly furnished me, as before stated, with a copy of the letter of R. R. Livingston to Washington, dated January 14, 1777, cited in the 9th volume, p. 410, of his "History of the United States," as authority for the charge he makes against General Arnold. So much of it as relates to the subject under discussion appears below. Livingston some time before had written to Washington recommending his brother's promotion, and he now says, "I take the liberty to enclose your Excellency an extract from a letter to him, written under General Arnold's direction by a gentleman of his [Arnold's] family, he being unable to hold the pen himself." After a warm recommendation of his conduct, both in camp and field, and giving him and his regiment a full share of the honor of the battle of the 19th of September, in which General Arnold not being present speaks only from the report of those who were, he adds, "On the 7th of October, the conduct of your corps fell *more immediately* under the inspection of General Arnold; he thinks it but justice to you and to them to observe that great part of our success on that day was owing to the gallant part they acted in storming the enemy's works, and the alertness and good order they observed in the pursuit."

In the battle of the 7th of October, Livingston's regiment (James Livingston,—not Henry B. Livingston, as Mr. Stevens erroneously supposes) was one of those which Arnold personally led in storming the enemy's intrenchments, and their conduct therefore "fell more immediately under the inspection of General Arnold," more so than in the battle of the 19th of September. General Arnold having in the charge been so severely wounded that he was "unable to hold the pen himself," a gentleman of his family, by direction of General Arnold, writes a letter to Colonel Livingston, giving him a full share of the honor of the battle of the 19th, in which General Arnold *not being present* speaks only from the reports of those who were.

Upon this statement of R. R. Livingston, giving the purport but not the words of—not what General Arnold himself had written, but what had been written by a gentleman of his family; upon this ambiguous statement Mr. Bancroft declares that General Arnold himself says he "was not on the field of battle" (vol. ix. p. 410, Hist. of U. S.), and insists that he was not "engaged" in the battle of the 19th of September. The exact truth is, R. R. Livingston says in his letter to Washington that a member of General Arnold's family wrote to him, that in giving Colonel Livingston "a full share of the honor of the 19th September, not being present, he speaks from the reports of those who were."

But what is the true construction of the expression used by R. R. Livingston, "General Arnold not being present"? "Present" where? Obviously, "present" with Colonel Livingston's regiment. He adds, and here he quotes, "On the 7th of October the conduct of your corps fell *more immediately* under the inspection of General Arnold." On the 19th of September, "you and your regiment" were not immediately under the direction of the general, he not being "present" with them as he was on the 7th, and he therefore speaks from the reports of those who were. On the 19th, "General Arnold not being present speaks only from the report of those who were."

He is speaking of the conduct of Colonel James Livingston, and when his aide says he was not "present," he means "present" with that regiment, as he was on the 7th, when their "conduct fell *more immediately under*" his inspection. Where was he, then? Mr. Bancroft assumes that because he was not with this regiment he was not on the battle-field anywhere, and did not participate in the engagement! Where was he? He was with Morgan, with Hull, giving orders to Colonels Cilley, Scammell, Cook, Courtlandt, and General Learned. Colonel Varick, in his letter of the evening of September 19, after giving a "circumstantial account" of the battle and General Arnold's various orders, as hereinbefore detailed, adds, "In this action Major Livingston (acting as Arnold's aide), being sent out with orders, remained a spectator till the close." Who but Arnold sent out General Arnold's aides with orders?

Such I submit is the fair construction of this letter of R. R. Livingston; so understood, it is perfectly consistent with all the letters of Varick and of Major Henry B. Livingston, and Arnold's report to Gates, and the statement of Neilson, the guide of the American troops, of Burgoyne, and Major Cochran, all of whom declare General Arnold commanded and led his troops in the battle. (Life of Benedict Arnold, pp. 163, 190.)

What an illustration of the harshness, shall I not say the unfairness and cruelty of judgment and criticism? to which Arnold has in consequence of his treason been subjected, when this ambiguous phrase,

written by his aide, he himself having been so grievously wounded as to be unable to hold a pen, and in a letter bearing generous testimony to a brother soldier, in which his aide simply says he speaks of Livingston's conduct on the 19th from the report of others, the words "not being present" have been construed to mean that Arnold was not present on the field, and did not participate in a battle which he "begged and entreated" permission of Gates to fight, and which he did successfully fight, and for which Varick and Livingston say the whole army "gave him all the credit," and his colonels and general officers signed a paper thanking him especially for his conduct on that very day! Well might the careful and accurate Mr. Lossing say that but for Arnold, Burgoyne would have marched into Albany a victor!

But Mr. Bancroft, in his note of December 15, 1879, above quoted, adds, "But what I look upon as still more conclusive is the statement of Judge Marshall after mature inquiry. In his first edition of the 'Life of Washington,' vol. iii. p. 277, he says that Arnold was on that day completely 'engaged'; but the publication of this work brought to him the knowledge of his error, and in his second edition he cancels his former statement, and gives the correct narration of the affair, with an explanatory note."

Let us see exactly what he did say. In the first edition, vol. iii. p. 277, he says, "Arnold, with nine Continental regiments and Morgan's corps, was completely engaged with the whole right wing of the British army." In the second edition, vol. i. p. 201, he says, . . . "upwards of three thousand American troops were closely engaged with the whole right wing of the British army." And he explains the change in the text by these words in a foot-note: "*The accounts of the day*" [written before Arnold's treason] "stated that the Americans were commanded by General Arnold, but General Wilkinson says that no general officer was on the field."

Wilkinson's statement, made more than thirty years after the battle, and of facts of which he could have had no personal knowledge, he being on Gates's staff, and not in a position as an eye-witness to know who were actually engaged, has been sufficiently commented upon in the "Life of Arnold." Marshall, in consequence of Wilkinson's statement, modifies his text as above given, and in a note offsets Wilkinson with "the accounts of the day," and in his amended edition does not state whether Arnold was or was not engaged, but gives Wilkinson on one side and "the accounts of the day" on the other, and leaves the reader to draw his own conclusions! And this Mr. Bancroft thinks "conclusive!"

I have thus fully, and I think fairly, stated all the evidence produced by Mr. Bancroft and Mr. Stevens in relation to this charge, and I believe this is all there is upon which we are asked to reject the

positive testimony of Colonel Varick and Major Livingston, and all the cumulative proof hereinbefore referred to.

But the evidence on this subject is constantly accumulating, and I will now ask attention to additional proof, which has been brought to my attention since the "Life of Arnold" was published.

First I will cite the testimony of General William Hull. He was on the 19th of September, 1777, major of the Eighth Massachusetts Regiment (Colonel Brooks's). I quote from "Revolutionary services of General William Hull, prepared from his *manuscripts* by his daughter, etc., etc." (D. Appleton & Co., 1848.)

In the preface his daughter says, "General Hull left behind him memoirs of his Revolutionary services in manuscript. These memoirs are the basis of the present work. The *facts* are in substance *precisely as he has related them.*" We may, therefore, assume the following to be the statement of Major Hull. On page 92 he says, "On the 19th of September, about 12 o'clock, General Burgoine advanced towards the left wing of the American lines. . . . General Burgoine then brought his effective force into action, when Morgan was in his turn compelled to retreat. But he was soon reinforced by a number of regiments from the left wing of the army, *commanded by General Arnold*, and about one o'clock the action was renewed with great obstinacy." On page 93 he says, "As soon as the action had recommenced, General Arnold rode to the ground which was occupied by the guard of Major Hull. He called the officers around him, and inquired what number of men was at that post. He was informed that it consisted of the guard of two hundred and fifty men and two regiments. General Arnold then said that three hundred volunteers, to be commanded by a field-officer, must immediately reinforce the troops which were engaged. He repeated that he wished them all to be volunteers. As none of the field-officers offered their services, Major Hull observed to him that he commanded the guard on that day by an order from the adjutant-general, but if he could be excused from that duty he would be happy to command the detachment. General Arnold replied that *he* would excuse him, and directed the colonels of the two regiments to call for three hundred volunteers and a suitable number of captains and subalterns to command them. In a few moments the number required was paraded and formed into four companies, with the officers assigned to them." . . . "This battle of the 19th of September commenced between twelve and one o'clock, and continued, with not more than half an hour's intermission, until nearly dark." P. 97.

The next witness is Captain Ebenezer Wakefield, who left in manuscript a detailed statement of this battle for his children, a copy of which was furnished me by his grandson, Thomas W. Johnson, of the city of New York. Mr. Johnson is a stranger to me, but he and Cap-

tain Wakefield are both vouched for by the Rev. *Thomas Wakefield* Goodspeed, of the Baptist Theological Seminary of Chicago, a gentleman of the highest respectability. His note is as follows:

"NORTHWESTERN BAPTIST EDUCATION SOCIETY,
April 27, 1880.

"HON. ISAAC N. ARNOLD.

"DEAR SIR:

"Your letters of inquiry regarding Captain Thomas Wakefield are at hand. He was my mother's grandfather, and she remembers him very well. He was born about 1745–50, and lived until 1834–36. My mother visited him in 1834, and soon after the visit he died, being about eighty-five or ninety years old. His wife lived to the age of nearly one hundred, and died in 1855. My mother remembers him as being always called Captain Wakefield. He was an officer in the Revolution, and received a pension until he died, and his widow then received it until her death. He was a man of great intelligence and considerable education. I cannot say positively whether he was an ordained minister, but he was a preacher. He was held in the highest esteem by his friends and neighbors, and in great veneration by his children and grandchildren. As a Revolutionary soldier, a superior man, and a true Christian, any statements of his may be implicitly relied upon, and none would be more likely to have inherited his manuscripts than Thomas W. Johnson, who is his oldest living grandson. Regretting that I cannot give you fuller information, I am,

"Yours most truly,

"THOMAS W. GOODSPEED."

Thomas W. Johnson, the grandson, sends me the statement of Captain Wakefield, entitled "Unpublished Recollections of the Campaign of 1777." He gives in the paper the following facts:

He says Wakefield was in the trenches at Bunker Hill, went with Arnold to Quebec, was near him in the assault, helped him to the hospital after his leg was broken by a musket-ball, and fought in both the battles of Saratoga, and left in writing his *recollections of these battles.*

Of the battle of the 19th September, 1777, he says, "Being attached to Dearborn's light infantry, which had a conspicuous part in the battles of the 19th of September and the 7th of October, I witnessed the principal movements of both, and therefore speak from personal knowledge. I propose to narrate the events of the campaign of 1777, as they establish clearly the debt of gratitude the country owes to General Schuyler, and show that to Arnold belongs the credit of being the victor and hero of the two battles of Saratoga. They strip Gates of his assumed honors and exhibit the envy and vindictive jealousy with which he treated Schuyler and Arnold. . . .

"You must not understand that in eulogizing Arnold for his conduct and heroism in the battle of the 19th September that I intend to excuse his treason or to make it less odious. . . . The battle-ground was selected by Arnold and the Polish general Kosciusko, and under their supervision fortified. . . .

"Who was the hero of the first conflict? Was it Gates? There is

no evidence that he even witnessed the movement of a battalion in the fight. Astonished at the results of a battle in which he had no part, and knowing that Arnold was the hero of the field, his jealousy was excited, and he determined to rob Arnold of the honor. This was a herculean task; a thousand letters had gone from the camp into every section of the country proclaiming Arnold as the hero of the battle. Gates's friends presuming upon the effects of a crime perpetrated afterwards, and which has consigned his name to the just execration of posterity, have tried to rob Arnold of the credit he justly earned as the leader of this battle.

"Notwithstanding the treachery which blackened his fame, no more earnest patriot drew his sword on that Saratoga battle-field than Arnold, and none more fearlessly exposed his life in leading his battalions to victory.

"I have before me the memoirs of Wilkinson, the adjutant-general of Gates at the time of the battle. Gates was jealous of, envied, and hated Schuyler, and all who were friends to that estimable gentleman, officer, and patriot; his young adjutant was jealous of, and an enemy of Arnold, and finding after the battle that the whole left wing of the army (Arnold's command), whenever he made his appearance to review or inspect the line, received him with shouts and cheers that rang through the whole camp and startled the enemy on the hills beyond, while Gates and his staff could traverse the whole line without exciting more than a silent salute and a sullen presentation of arms from the men. This marked preference maddened Gates and infuriated his adjutant-general, and Wilkinson gave General Poor to understand that such extravagant demonstrations were disrespectful to Gates as commander-in-chief and should be suppressed. General Poor replied, 'You might as well undertake to repress the frenzied fury of Arnold on the field of battle as to restrain the men from expressing their admiration of the man who led them to victory.'

"'By observing,' said General Poor, 'when Arnold rides down the line again you will see that these extravagant demonstrations, as you call them, are not confined to the rank and file, but are shown by the line- and staff-officers.'

"'Is it intended as an insult to General Gates?' asked Wilkinson.

"'Rather as a rebuke, sir,' replied General Poor.

"None were more enthusiastic in their demonstrations of respect than Morgan's riflemen and Dearborn's light infantry. Both these officers had followed Arnold through the wilderness of Maine to assault the fortress of Quebec; none held him in greater respect, and none were more demonstrative in expressing their admiration after the battle of the 19th of September. To punish them for demonstrations so obnoxious to this young coxcomb, he (Wilkinson) induced Gates to withdraw them from the left wing (Arnold's command) and hold them

subject to orders from headquarters. This order was most offensive to Arnold, but not more so than to the officers and men. They regarded it as an insult to Arnold, and a rebuke to themselves for the enthusiasm of their demonstrations of respect for him who by his heroism had won the respect of the whole army, with the exception of Gates and his staff. If the adjutant-general expected our withdrawal would check these demonstrations for Arnold we gave him some startling evidence of his mistake, for we let no opportunity pass without trying to convince him of his error. Whenever Arnold appeared, mounted or on foot, we made the camp ring with cheers.

"In his memoirs, Wilkinson asserts that in the battle of the 19th our soldiers were without a commander to direct the movements of the various detachments which took part. In this assertion he willfully and deliberately falsifies the fact, and for the dastardly purpose of stealing the credit from the man whose heroism, notwithstanding the magnitude of his subsequent crime, entitles him to the truth of history. There are fortunately many still living who participated in the battle of the 19th of September, and who are ready to stamp his statement as false.

"A persistent effort has been made from the day of the battle to rob Arnold of the glory. Being attached to Dearborn's light infantry, which had a conspicuous part in the battles of the 19th of September and the 7th of October, I had the opportunity of witnessing the principal movements of both, and therefore speak from personal knowledge.

"I shall never forget the opening scene of the first day's conflict. The riflemen and light infantry were ordered forward to clear the woods of the Indians. Arnold rode up, and with his sword pointing to the enemy emerging from the woods into an opening partially cleared, covered with stumps and fallen timber, addressing Morgan, he said, 'Colonel Morgan, you and I have seen too many red-skins to be deceived by that garb of paint and feathers: they are asses in lions' skins, —Canadians and Tories; let your riflemen cure them of their borrowed plumes.'

"And so they did, for in less than fifteen minutes the 'Wagon Boy,' with his Virginia riflemen, sent the painted devils with a howl back to the British lines. Morgan was in his glory, catching the inspiration of Arnold, as he thrilled his men; when he hurled them against the enemy, he astonished the English and Germans with the deadly fire of his rifles. Nothing could exceed the bravery of Arnold on this day; he seemed the very genius of war, infuriated by the conflict and maddened by Gates's refusal to send reinforcements, which he repeatedly called for, and, knowing he was meeting the brunt of the battle, he seemed inspired with the fury of a demon. Riding in front of the line, his eyes flashing, pointing with his sword to the advancing foe, with a voice that rung clear as a trumpet and electrified the line, he

called upon the men to follow him to the charge, and then dashing forward, closely followed by his troops, he hurled them like a tornado on the British line and swept it away. There seemed to shoot out from him a magnetic flame that electrified his men and made heroes of all within his influence.

"Arnold was not only the hero of the field, but he had won the admiration of the whole army. There was not a man, officer or private, who participated in the battle, or who witnessed the conflict, who did not believe that if Gates had sent reinforcements, as Arnold again and again begged him to do, he would have utterly routed the whole British army. So general was this belief, and so damaging to Gates, that as an excuse to save himself from reproaches coming from every side he gave out as the reason that the store of powder and ball in the camp was exhausted, and that the supplies of ammunition from Albany had not arrived. No one could dispute this, yet no one believed it.

"Up to this time General Gates had acted only as a figure-head in the army, having taken no part in the engagement of the 19th.

"The quarrel between Gates and Arnold caused the latter to resign, but the urgent solicitation of every officer in his command, and the wild enthusiasm of his men whenever he happened among them, induced him to resume his command, and declare that no personal consideration should induce him to abandon them on the eve of another battle. This announcement was received with an applause that rang throughout the camp, and was heard within the British lines, and conveyed to Gates the unmistakable evidence that the sentiment of his army would no longer tolerate his vindictive treatment of a soldier who had become their idol, and who was their reliance in the approaching battle.

"The great crime which justly consigned Benedict Arnold to infamy cannot obliterate from our recollection his daring achievements as a soldier, nor prevent our admiration for him as a patriot. The man who lacks the moral courage to acknowledge his services, and to do justice to the fallen hero, for fear his own patriotism may be questioned, is himself a *moral coward!*

"It would certainly be cowardly in us; we who under his lead successfully baffled the storms, hardships, and privations in that most terrible march through the trackless wilderness of Maine to storm the fortress of Quebec; we, each one of whom felt, when we reached the Gulf of St. Lawrence, that we owed our lives to him who cheered us on, and who by his wonderful energy and endurance and his dauntless perseverance saved us from starvation and despair. No man living but Arnold could have extricated us from such terrible difficulties and saved his little army from annihilation.

"The man who could forget these services would be an *ingrate;* such a man would be too cowardly to defend the truth when falsehood and malignity assailed it.

"I know many a brave comrade of Arnold, who, while he condemns his crime, has the courage and manhood to remember and acknowledge his virtues; and who, while detesting his treason, wept at his fall."

I next quote the testimony of Samuel Poppleton, as furnished me by his grandson, O. Poppleton, of Birmingham, Michigan. "My grandfather was in the battle of September 19, in the skirmish line under Arnold, and said, 'Arnold, Poor, and Morgan, with less than three thousand men, sustained the unequal contest during that whole day.' . . . 'Arnold was conspicuous in the fight. I saw him frequently on that eventful day, seeming to be ubiquitous. He appeared to be present at all points of the battle-field. If our lines weakened anywhere, he discovered it and strengthened them, directing in person the movements of the troops, and infusing into them his own energy and confidence of success.'"

The statements of Wakefield and Poppleton were furnished me by strangers, whose attention was called to the subject by what they read in the newspapers, and they are only two among quite a number of a similar character.

Major-General J. Watts de Peyster has kindly furnished to me the evidence contained in Von Elking's journals, and letters of the German troops, published at Hanover, 1863. He says, Part I., p. 298, "They [the Americans] were led by General Arnold." General De Peyster thinks, after examination of all the testimony, that "it is impossible that Arnold, with his temper and temperament, being in command this day, was not actively engaged. For him to have participated was simply the conclusion of a syllogism."

General Riedesel (i. 150) makes the same statement. The Germans had some reason to know who led the troops they were fighting that day.

Mrs. Ellen Hardin Walworth, whose home is at Saratoga, and who has made these battles a special study for years, and who has year after year gathered up from visitors the traditions of the descendants of the soldiers who fought the battle, says, in her "Saratoga, the Battle and the Battle-Ground," "Arnold led with his usual spirit." (P. 23.)

W. L. Stone, in his "Burgoyne's Campaign," says the same. He details Arnold's active leadership and heroism in both battles. Both Lossing and Washington Irving having read the Schuyler manuscripts, declare that Arnold was the leader in this battle.

These statements are strongly corroborated by Ezra Buel, a guide to the American army in the battle of the 19th September, and also in that of the 7th of October. William Wirt, in a letter to William Pope, dated August 20, 1821 (see Kennedy's "Life of Wirt," vol. ii. p. 115), visited the scene of the battle of the 19th of September, Buel acting as his guide. Buel, he says, is honorably mentioned by Professor Silliman. Wirt quotes the old guide as pointing out the

positions of Arnold and Morgan on the field, saying, "Here Morgan was posted. Here was Arnold, then a patriot and excellent soldier," etc., and he goes on to describe the battle under Arnold's leadership.

The evidence of Mr. Bancroft's error, blindly and eagerly followed by Mr. Stevens, accumulates. While writing this article I have received a report of a paper lately read before the Rhode Island Historical Society by Mr. R. A. Guild, the librarian of Brown University. It is from the "Diary of the Rev. Hezekiah Smith, D.D." He was chaplain to Nixon's regiment in 1777. I extract the following from the report of his paper: "His diary and letters contain a very full account of the battle of Stillwater, utterly refuting the representations of some distinguished historians. He makes Arnold the hero of this great battle, thereby sustaining the ground taken by Isaac N. Arnold in his 'Life of Benedict Arnold.'"

But I will stop, fearing I have already wearied the reader with an accumulation of evidence upon a question which, since the publication of the letters of Varick and Livingston, has been no longer debatable.

A word more and I will close. I need scarcely repeat that my object in writing the life of Benedict Arnold was not to excuse, extenuate, or "apologize" for his treason. I did not seek, in the language of one of my critics, "to regild a broken idol," but to vindicate the truth of history.

His brilliant career as a soldier, sadly closing in utter darkness, teaches, as nothing else can teach, that treachery is a vice never to be condoned or forgiven. Therefore his name must forever appear as a beacon and a warning on one of the blackest pages of American history; but it is equally true that among the bravest and most gallant soldiers of the Revolution, whenever and wherever the whole truth is told, will appear the name of Benedict Arnold.

> "Never a gallanter soldier, whatever his after-crime,
> Fought on the red field of honor than he in his early time."

ISAAC N. ARNOLD.

HISTORICAL TYPES OF SHIPS.

WHEN the "Demologos" was planned and built by Fulton, it was a great change from the method of warfare of those times. It is described thus:

At the close of the year 1813, Robert Fulton exhibited to the President of the United States the original drawing, being a representation of a proposed war steamer, named by him the "Demologos." It is doubtless the first record of the first war steamer in the world.

Its dimensions were, length, 156 feet; breadth, 56 feet; depth, 20 feet; tonnage, 2475 tons; engine, one 48-inch cylinder and 5-feet stroke; length of boiler, 22 feet; breadth, 12 feet 4 inches; depth, 8 feet. With a proposed draft of water of 15 feet. The sides were of solid timber, 45 inches thickness, extending from the top of the port-sill to the bottom of the gun-deck beam; above the port-sill it curved gradually to the upper deck beam to a thickness of 24 inches, also coming to the thickness of the frame, 9 inches, at 5 feet below the bottom of the gun-deck beams, which was also 3 feet below the proposed water-line.

The boiler was located on one side of the central paddle-wheel, and the engines on the opposite side.

This ship was to carry an armament of twenty guns on one deck, mounted on slide carriages. The guns were arranged for an all around fire.

The ship was made with both ends alike and a bowsprit on either end.

This design was, for its day, the most formidable ship in the world, and it was represented by Fulton as capable of carrying a strong battery, with furnaces for red-hot shot, and being propelled by steam at a rate of four miles per hour.

It was contemplated that this vessel should also carry submarine guns, two suspended from each bow, so as to discharge a 100-pound ball below the water-line. She was also to be provided with an engine, which would discharge an immense column of scalding water upon the decks of an enemy.

The estimated cost of the vessel was three hundred and twenty thousand dollars.

By June, 1815, her engines being on board, she was so far completed as to afford an opportunity of trying her machinery. On the

first of that month, at ten o'clock in the morning, the "Fulton," the first "man-of-war" steamship, left the wharf near the Fulton Ferry of New York; she steamed by the forts, and saluted them with her 32-pounder guns. Her speed was equal to the most sanguine expectations. She made fifty-three miles in eight hours and twenty minutes, in a subsequent trial, without the use of sails, with which she was provided, the wind and tide being partly in her favor and partly against her.

In a treatise on steam-vessels published in Scotland at that time, the author states that he has taken great care to procure full and accurate information of the New York steam-frigate. He says, "Her length on deck was 300 feet; breadth, 200 feet; thickness of her sides was 13 feet, alternate of oak-plank and corkwood; carries 44 guns, four of which are 100-pounders; discharges 100 gallons of boiling water in a minute; and, by mechanism, brandishes 300 cutlasses with the utmost regularity over her gunwales; works also an equal number of heavy iron pikes, darting them from her side with prodigious force and withdrawing them every quarter of a minute."

She was very successful, and a powerful steamship for the times, and for a man-of-war was a great stride; yet how many years elapsed before it became apparent that steam was the proper motive-power to apply to a ship of war! and how many objections were raised to its utility! And it was not until 1839, after Commodore Matthew Perry had shown the absolute necessity for the use of steam as a motive-power to the Navy Commissioners, that a board of naval constructors, consisting of Mr. Hartt and Mr. Humphrey, met in New York to devise a plan for the building of two steamships, viz., the "Mississippi" and "Missouri."

"In the latter part of 1839, Captain Ericsson proceeded to America, where he has remained ever since, previous to which, however, he had made the acquaintance of Captain Robert F. Stockton, and the "Robert F. Stockton," screw-steamer, was launched in July, 1838, at Liverpool. In July of that year a trial of that steamer was made in the presence of about thirty gentlemen. Her dimensions were 70 feet in length and 10 feet beam, and her engine-boilers about 50 horse-power. She towed four laden coal barges lashed alongside of her, so as to make a total breadth of 59 feet, at the rate of 5½ miles per hour.

"In the earlier experiments, Ericsson employed two propelling wheels; but, in one of the trials, at which Mr. F. P. Smith happened to be present, he suggested to Ericsson that he would probably obtain a better performance if he removed one of his wheels. This was according tried, and Smith's anticipations proved to be correct."

From the connection of Mr. Ericsson with Commodore Stockton came the building of the steamer "Princeton," the first screw-steamer of our navy.

In the month of September, 1837, Mr. F. P. Smith, an Englishman, proceeded in a small propeller from Blackwell to Gravesend and

other points, and the success of the trip of this little vessel attracted the attention of the English Admiralty.

In March, 1838, two trials were made in the presence of the Admiralty officers; these trials were considered so satisfactory that the adoption of the propeller was made certain, and a vessel was built and launched in 1839. She was built under the idea that if her performance should be five knots an hour it would be satisfactory. She was two hundred tons burden, and her engines collectively had eighty horse-power. She was fitted with one screw, which was placed in the dead-wood. On the 15th of May, 1839, she proceeded to sea.

This was the famous little ship "Archimedes," the success of whose performance has revolutionized the commerce of the whole world, and it was just at this time that it was being discussed whether we should have two paddle-wheel steamships in our navy as ships of war.

The shipping of the last forty years has received its impetus from the performance of this little ship "Archimedes."

"The 'Rattler' was the first screw-ship for the English navy, and was constructed and launched in 1843. Her performance was so satisfactory that the English Admiralty ordered twenty vessels to be fitted with the screw, under Mr. Smith's directions.

"Smith's patent was taken out the 31st of May, 1836. Ericsson's patent was taken out July 13, 1836. The first trial of Ericsson's experimental boat was made April 30, 1837. The first trial of Smith's experimental boat was made May 31, 1836. In the summer of 1837, Ericsson exhibited his vessel to the Lords of the Admiralty. In September, 1837, Smith carried his vessel to sea. Ericsson's vessel was more efficient than Smith's, its engine-power was greater, and its construction more perfect."

The propeller ship of war came into the navy of the United States at almost the same time as it had done in the navy of England, its introduction following careful and suitable experiments.

By the building of the U. S. steamship "Princeton," in 1843, screw propulsion was introduced into the navy of the United States. She was classed as a second-rate sloop-of-war.

With the "Princeton" came also the introduction of larger guns, which were, unfortunately, not properly constructed. The dreadful tale which the bursting of one of her guns told caused the ship to become very unpopular with the navy.

At this time there was a wide difference of opinion among the advocates of the "screw" and "side-wheel," as to which was the best instrument of propulsion, on both sides of the Atlantic, and the strife has continued until there is not to-day a "paddle-wheel" used upon any ocean steamer, and all has been accomplished within thirty-five years. Its final success has been assured by the use of the compound engines.

In 1847, by an act of Congress, four steam-frigates were commenced, —the "Saranac," "San Jacinto," "Susquehanna," and the "Powhatan." All these were excellent vessels, and fully up to the times; they were not fast, however, having only auxiliary power. With a consumption of two thousand four hundred and sixty-six pounds of coal per hour, the speed of the "Saranac" was $8\frac{14}{100}$ knots, while the "San Jacinto's" speed was put down at eighteen and one-half miles in two hours. On her trial-trip her speed was ten miles per hour.

The establishment of the screw as the propelling instrument became from this departure a settled fact, more especially for "ships of war," and no effort would cause any person to-day to go back to the side-wheel steamer, except where a very light draft is required.

To-day we often note in the performance of ships of foreign navies a speed of thirteen and fourteen knots, which ships use the propeller only. It has been a long strife, and an immense amount of money has been spent before this conclusion was arrived at.

After repeated attempts to make fast ships for our navy, in 1854 the bureau at Washington designed four or five frigates with an auxiliary steam-power, and they were regarded as unexceptionable ships for the times. They realized all that was expected of them, they having full sail-power and fair engine-power; they were far ahead of any other ships of the same class in the world at that time, and to-day they stand as wooden ships of a remarkable construction.

The commercial world, especially in the United States, was at this time doing its best to produce fast steamships, and the press of the country, especially of New York, ridiculed the work of the Navy Department at Washington, placing such stress upon it that the Secretary of the Navy felt compelled to yield to the popular clamor and to have one of these ships built at the New York navy-yard, called the "Niagara," under the superintendence of Mr. George Steers, then the most famous yacht-builder in the world. Need I say that Mr. Steers's efforts to produce a "ship of war" proved a failure? The whole of the navy was opposed to him, and his ship, which was to speed seventeen miles an hour, made only ten and a half and eleven miles at the best.

The design of the ship did not correspond with the intended battery, or the required displacement to the intended draft of water, and it was necessarily changed. Yet to-day this is the class of ships that the world is trying to produce, and if the machinery had been as perfect as the model, Mr. Steers would not have been so ingloriously beaten as he was.

Take the "Niagara" frame, which still remains good, and give her the machinery of to-day, and she would produce a speed of seventeen knots. Her model is beautiful, although at the time it was produced it was ridiculed by all the naval men.

Subsequently, the Navy Department was led into the same class of ships, and produced the "Wampanoag," now "Florida"; which ship obtained a speed of twenty statute miles per hour, even without the aid of compound engines, which, I think, should be placed to the credit of Benjamin F. Isherwood's machinery, on a faultless model by Mr. Delano.

Now comes the greatest event in the histories of navies, one which caused a change in the whole of the face of modern warfare, and that was the building of a few ships in France during the Crimean war, the "La Gloire" being one of them. They were simply wooden ships clad with four inches of iron plates to resist shot. England, always on the alert, immediately built the "Warrior," an iron ship throughout. Soon the political condition of this country called for something similar in our navy, and Ericsson came to the front with his monitor ship, into which, when completed, the men were driven, as it was so singular in its design they feared to go to sea in her. The idea of a turret-ship was born in an hour, and the work was completed in one hundred and fifty days after the contract was given, under the direction of Mr. Ericsson.

I remember well the prejudices which existed against the introduction of this class of ships into our navy. Their points were a powerful battery inclosed in the smallest possible space, leaving as small a surface of the hull exposed as was possible. No improvement can be made upon this idea of a ship for harbor defense, if that is all that is required, except in the elevation of the guns, which is their principal fault, and greatly reduces their value in attacking fortifications.

The barbette system seems to be better for this purpose, as by it you obtain the desired elevation to the guns.

The monitor and ironclad system of ships caused an increase in the size of the guns to penetrate the armor, and the race has been to this day between the guns and the armor-plating, until the ships have had to yield to the former, as the latest experiments show 9-inch guns with a power of penetration far in excess of some of the larger ones. Various designs have been made during this race for supremacy between the guns and the ships, but as yet none have given perfect satisfaction.

The gradual increase in the weight of the armor and guns has almost brought us back to the proportions of the old "Demologos," when we see such ships as the "Inflexible" and "Duilio."

The Russians have abandoned all form and dimensions in ships, and, under the direction of Admiral Popoff, have brought out circular ships. This again has caused another departure, viz., to abandon all armor, as is the case in the new Italian ship, and build a ship entirely in compartments.

The "fast" ship has been called for as an offset to all the armor,

but it is found that a ship cannot get away from her screw, and some of the armored ships have as much or more speed than some of the intended fast ships.

After looking over all these points, some of our naval men think that a fast ram-ship will overcome all the difficulty; but when we go back to the earliest times in which sea-fighting was carried on, the Romans and their opponents are found with ships having beaks, or rams, which were used as one method of destruction in close fighting.

There is a similarity in their methods of fighting with ours in this respect, that they did not depend upon the power of the wind to move their ships; they had a mechanical power, which they could use to a greater or less extent, as might be called for, in bringing their ships into or out of action.

What steam-power is to us to-day the oars were to them, and, for the advance of the times and the methods of fighting, they were as effective as steam is to us at the present time.

These ships of theirs were enormously fast for the time, being provided with power in proportion to their dimensions far in excess of the proportionate steam-power of the ships of war of to-day. We seldom find that the ramming-power was used to any great extent in the excitement of the battle, as the projectiles used would keep the combatants at a certain distance from each other, just as they do to-day.

When the subject of ramming comes up, it is almost always as a forlorn-hope, and it is not used until all other means of offense are exhausted. The power of using the projectiles is gone, when the ship's commander makes up his mind to use the ram-power.

There is a new element in the sea-fighting of to-day, which seems to antagonize this method of warfare. Almost all nations at the present time are experimenting with some kind of torpedoes, and all the ships are provided with them; and, as was seen in one of the late contests in South America, although there was a disposition on the part of one of the combatants to use the power of the ram, yet the fear of a torpedo-boat present hindered its being used.

The ram, then, seems to have been taken up by various nations and used for a time, to a certain extent, not as a "positive" method of warfare so much as an "experimental" one.

If the torpedo warfare obtains for its purpose (which it seems to have done) machines which develop a much higher velocity than any steamship afloat, it would seem to put the ramming of ships as the only correct method of warfare at a great disadvantage; and although the ram as one method of fighting the ship might be made use of as a last resort, it could hardly be said to be a wise expenditure to make a fleet of vessels whose only power of offense would be the use of the ram alone; for, in the absence of the defensive power of the gun, and the offensive power of the torpedo, we have a ship whose only power of offense is

the speed with which she could approach her opponent in order to give an effective blow.

I think this will show the weakness of a ship which has only a ram to use. Her work must be done during the darkness of the night to be efficient, or among fleets when all the ships are engaged, when torpedo work can be more thoroughly done, and at much less expense; or else it must be at an expenditure of power upon a hull perfectly enormous, in order to make it possible to overtake any ship against which she may be in operation; and unless the speed is superior to any ship afloat, it would be dangerous to build up a navy of ships whose only offensive power would be that of ramming.

It is for some such reasons, then, as I present, I suppose, that it will be found the naval powers of the world, in making up their minds as to the most powerful and efficient engine of warfare, have decided to use the ram as an additional weapon only, and have not depended solely upon its use in the creation of a navy.

Another argument comes up at this point, which is this:

The ramming-power is most efficient when attached to the largest bulk at its highest speed, and as the most of the ships with which we would have to contend in war would be iron-plated and of immense size, having water-tight bulk-heads in great profusion, the mere making of a hole in such opposing ship would hardly involve her destruction. Besides, should the ram be on a smaller ship than her opponent, the force of the concussion of her own blow against a heavily-armored ship would most likely react upon herself. We will say nothing about the chances of being destroyed by the enemy's means of defense, either by guns or torpedoes, before the ships can possibly come into contact, for it is not a supposable case that the ship to be rammed is to remain at rest for the pleasure of being destroyed by another ship.

These things have been fully considered by the officers of foreign navies when the questions of offense and defense have arisen, and the number of ships will be comparatively few which will act solely as rams, yet almost every ship which has been built will be provided with one as another powerful auxiliary means of offense.

The words of Admiral Goldsborough are as applicable now as ever: "Every ironclad, as a matter of course, should be an unexceptionable ram, or, in other words, susceptible herself of being used as a projectile."

If the work of ramming is used as the means of warfare by any nation, those nations who propose to fight the ram will take this fact into consideration and introduce a compartment at the height where the blow is to be delivered, and thus effectually prevent any serious consequences when it is received.

Now we come to the use of the torpedo. This is a most powerful weapon, and must continue to be so, and our new navy cannot be pro-

duced without reference to its powers, and with such preparations as shall be shown to be most efficient as protection against the use of it by other nations.

The best method of the use of torpedoes up to the present time has been to place them in fast launches, which can be carried by any ship, instead of large and expensive vessels. This disposes of the idea of building torpedo-ships. What, then, shall be done? The heavy ironclad properly protected calls for enormous displacement and cost of construction. If she carries guns of a large size it necessitates also a corresponding ship.

Of all the ships which have been constructed up to this time, what ship is there suitable enough for the requirements of our navy to-day of which our officers could say, "With this ship I do not fear to cope with any of the enemies of our country"? Is it the large ships just completed in Italy? Is it the "Inflexible"? Is it the Russian circular ships? Is it the fast ships of the "Shah" class? The "Thunderer," "Devastation," "Glutton," the "Northampton"? What might be considered a representative ship of the first class for our navy? Would the building of monitors continue as they have been built, with their slow-firing and easily-jammed turrets?

Let me try to describe a first-class ship which is called for in our navy to-day.

In the first place, she must be fast enough to choose her own position; her engines and machinery must be perfectly protected; she must handle so readily as to turn about in her own length; she must be able to go ahead and astern with equal facility; she must be suitably protected against projectiles of all kinds, and against ramming; she must have enough water-tight compartments to enable her to float under almost any circumstances; she must have all kinds of appliances for labor-saving; her breech-loading guns should be mounted so as to obtain the greatest possible elevation on machine-carriages, and be perfectly protected against the missiles of the enemy; her boats and anchor-gear must be of the most approved patterns; she must carry broadside guns, and be proof against torpedoes, and also have the means of using them to advantage; she must have the power of ramming at either end, without interfering with her propeller and steering-gear; and this should be all accomplished in the space of three hundred and twenty-five feet in length and not over sixty-two feet in breadth, and a draft of water of not more than twenty-three feet; her speed must be from sixteen to eighteen knots; and all of her accommodations must be well ventilated, and light. This is what is required, and with suitable tact and perseverance it can be accomplished.

The number of guns which can be carried will define the displacement of all other classes of ships. Thus, if the ship mentioned above

is to carry ten guns, we can reduce the displacement and size to the carrying of one powerful gun, and also to dispatch-vessels.

There is no question but there could be constructed some very nice ships armed with the new 9-inch Krupp breech-loading guns, which ships could be built on the double-ender principle. They should not draw over sixteen feet of water, and they would greatly annoy any ships which have as yet been built. In order to bring out these classes of ships the greatest need is the production of suitable steam-engines. The guns and hulls, with other paraphernalia, are obtainable, but not so readily obtained are the engines which can give them the necessary speed of piston which such ships call for. They want, if possible, at least one hundred and twenty revolutions in a minute on a sixty-five- to eighty-inch cylinder, and with all the parts so strong that they can be driven right up to that speed, and hold it, without the least danger to the machinery or hull, and such boilers as will produce the steam to supply such engines all they can take, even to one hundred and fifty revolutions. As steam machinery is too apt to break down at a critical moment, its greatest reliability should be assured before many hulls are constructed. In no case should any machinery be put into a ship of war until its reliability has been thoroughly tested. How often in the history of steam navies have delays and detentions been caused by a disruption of parts when it was least expected! This, then, is the great want of to-day, perfect reliability of the steam machinery when driven at the highest speed, so as to carry our hulls at sixteen and eighteen knots speed for any length of time. After having obtained and being sure of the engines and propellers, the next point is to construct a hull in accordance with the description given for a first-class ship.

But for the man-of-war of the future, it is to be feared the use of sails will have to be abandoned altogether. They will hardly be in place with the machine already herein described; in fact, they would be very much in the way.

If circumstances should arise which would require the use of sails, something could be improvised, but the beautiful and picturesque sailing-ship must be left behind among the things of the past.

The sooner this idea is admitted, the better it will be for the navy.

INDEX.

BITS OF ARMY ETYMOLOGY.

IV.

THE rushes that grow by the brook and the salt *junk* of the sailor's mess are connected through the Latin form *juncus*, which gave its name to ropes once made of rushes. Hence old rope-ends were known as *junk*, and the ship's beef, being, in Jack's opinion, fully as tough, was dubbed salt *junk*.

Armed to the teeth is said to be a corruption of an algebraic pun, to the t^{th}, or to the last degree. It looks a little tenuous, but may pass muster as a specimen of sophomore wit.

Pun, by the way, is assigned to a root signifying equivalent to, as expressing a resemblance of form, though associated with diversity of meaning.

The *stockade* has little in common with the *stocks* of Wall Street, and these locomotive values have not that close connection with the *stocks* of the old parish prison that etymology at least would warrant.

The *redan* shows its *teeth*, though stripped of all armament, and a *redoubt*, even of the most hasty improvisation, is often a sad *drawback* to successful pursuit.

Dun is a word not altogether unknown in military circles, where it sometimes creates a *din* that may well remind the debtor of its other radical cousins in *thunder* and *tetanus*, the primary meaning of *tension* passing over into *tone*.

The *Howards* were once *hog-wardens*, and in like manner the field-*marshal*, for all his glitter, radicates in a horse-boy; the root is still seen in *mare*. So the *count* of the royal *stables*, *comes stabuli*, sinks into the village *constable*, and the doughty *shield-bearer* of chivalry becomes the village *squire*. Any *tailor* can claim kin with the *Talleyrands* and the *Taliaferros*, so far as cutting goes, though he deals with cloth rather than with the *ranks* or with the *iron* that enter into the latter names. *Snooks*, however, is a sad descent by contraction from *Seven Oaks*. *Copper*, the *cypress*-tree, and the *cyprian* are all christened from *Cyprus*, unless the island owes its name to that of the tree, which may be of Semitic origin and akin to the gopher, not of Florida, but of Genesis, where it is the wood of the ark. It may be interesting to note that

our *gopher* is seen also in *waffle* and *wafer*, the common idea being the honeycombed surface of the cake, as well as of the ground tenanted by the animal. Through the German form for honeycomb, *wabe*, we get finally to the words *web* and *weave*, and so to the notion of regularity of construction.

Honeycomb itself is worth a moment's delay. The first part of the word is said to be connected with a root meaning "like broken rice." The second part, as seen in *cockscomb* and *cam*, signifies a crest or ridge, so that the compound could be developed into a chapter of natural history.

Cutlass and *coulter* are identical in source, though put to such different use.

Horse was originally the runner, and the same conception is seen in *rash*. Of the several varieties of color, the *roan* is so named from *Rouen*, and the *bay* from its resemblance to a dye made from *berries*, or, as some have it, to the withered *bay* leaf. The *paint* of our Mexican frontier is a corruption of *pinto*, and the Texas wild-cat gets its name of *painter*, not as a variation of panther, but also as spotted. Hence too a *pint* as a marked measure. *Mule*, *mulatto*, and *omelet*, all show the same word element found in *mix* and *mingle*, the fitness of which is evident.

The *gauntlet* is so called from the act of *winding* something about the hand through the forms *wante* and *gant*, but the *glove* belongs to the palm, as seen in the Scottish *loof*,—

> "His *loof* upon her bosom."—BURNS's *Holy Fair*.

Furlough, in the Scottish form *fore-loofe*, seems to find a place here, signifying leave to go *forth*, ratified by giving the hand.

Laundress and *lavender* are etymological associates, the latter as an herb laid up with freshly *laved* clothing. The notion of liquidity carries us on to *lava*, but not to *lead*, a metal that shows itself, however, in *pilot*, who, *ex nomine*, should measure with the lead rather than *toil* at the *tiller*.

There is a root differentiated by a variety of terminations into the several meanings of *gallop*, *walk*, *roll*, all referring to movement of some sort, and possibly sonomimes, if the primary idea is that of the noise made.

> "Our youthful prime,
> It cometh not again—that golden time,"

when we intoned,

> "Quadrupedante putrem sonitu quatit ungula campum,"

a line ringing with the stroke of a cavalry charge we never then dreamt to see and have no desire to see again.

Either *trot* or *talent* is that which lifts us, to fall back again in the

one case, and perhaps in the other; and lifting, intensified into bearing, gives *toleration*.

Before leaving the stable we will take into consideration a bugle-call which has occasionally broken our slumbers, followed by a rattle of musketry along the picket-line that found us groping in the darkness for *boots and saddles* with a haste that never finds. It would seem to be a corruption of the French *boute selle*, and means the immediate incorporation with the saddle of a far more necessary part of the person than boots, these in fact being euphrastic substitutions.

Stopping at the artillery park, the *limber* shows traces of a time when an axe and a limb made a good enough cartpole.

Soon after the establishment of the artillery school an inspector was sent round to such batteries as then chanced to be upon the periphery of civilization, the centre of which was supposed to lie somewhere about the Fort Adams parade-ground, under charge of the Engineer Corps. This officer was loaded to the brim with professional conundrums anent fortification, nomenclature, and ballistics, and dire was the discussion comprehending the mysteries of the craft, from dowels and rondelles to drift and deviation. There was a placid subaltern who, on being questioned as to the contents of the battery-wagon, frankly confessed he had never had the curiosity to look into one, and there was a gallant major who, on the spur of the moment, formulated from his experience in Mexico a definition for windage as the whizzing of a ball through the air. And the earnest sobriety of his manner herein is said to have filled the eyes of his examiner with tears.

It was then we learned to discriminate between tar, pitch, and turpentine with all the acumen of a native North Carolinian, that we committed to a treacherous memory the exact weight of a gallon of water, and shocked our accurate captain by asserting that good powder should show no more than one per cent. of moisture, for read he not out of the book with melancholy hesitation, "'one-tenth of one per cent.,' yes, *only* a tenth, it says *only* a tenth"? and we adjourned to the sutler's and drowned the miserable recollection in beer.

All this was thought of as we wrote the word *dowel*, and it illustrates the origin of that term as drawn out, or *ductile*, while *merlon*, like *mural*, signifies a wall, and *hurter* descends from a Celtic etymon for ram.

Lintstock has nothing to do with *lint*, or scraped *linen*, although it means matchstick, and the first part of the compound originated in a name for rag, like *tinder*, which has an analogue in *tondres*, a provincial French term also meaning rag.

There is a recondite article of battery furniture known as a *grummet* wad. It does not help the matter much that the dictionaries derive the word from the French *gourmette* and that this means a curb-chain, but the sense of the root seems to be that which is bent or coiled. The wad

in question is a ring of rope apparently familiar as grummet rings to marine terminology, which, however, is a sort of linguistic Mont-de-Piété, where anything may be found from a cat-harping to a bobstay.

It must have been through a sympathetic appreciation of its original meaning as pillage that they took away our *forage* from us. Corn, however, is that which is *ground*, straw that which is *strown*, *hay* that which is cut, akin to *hedge*, and *oat* that which is eaten. So in the Latin equivalent for corn, *far*, is seen that which the land *bears*, and the French *foin* for hay is related to a root of similar meaning. *Barley* may belong here, but the latter syllable of this word seems to have the signification of plant, giving *leek* as *the* plant, *garlic* as a spear-plant, *hemlock* as an evil plant, and, perhaps, *barley* as the bread-plant.

Our *flag* has made many a heart *flutter* and quickened many a *flagging* step as the eye caught its glow, perhaps through the smoke of battle, perhaps far away over the plain, marking against the sky for some weary scout the solitary fort that is still to him a home.

The *trophy* marks the turning-point, and so becomes a token of victory. The *tropics* terminate the sun's yearly oscillation, and the *trope* gives a turn to monotonous prose. This idea of turning and twisting is seen in *torment*, *torch*, *tart*, and, curiously enough, in *tortoise* and *nasturtium*, or the *nose-twister*, an effect plainly observable with any ill odor. Pertinent here is the Italian term for hypocrite, *torcicollo*, or neck-twister, going one way and looking another.

The word *oscillation* is interesting enough to claim a moment even of a soldier's attention. It was a custom of classical times to hang up little faces of Bacchus upon the garden trees, that, as they revolved with the wind, were supposed to generously scatter fertility round the premises through the flattered complacency of the god who had the harvest in charge, in the matter of the vine and fruit generally. The practical Yankee gets a similar result through the repellant effect upon the crows of the cuttings of the village tin-shop. These little faces were called *oscilla*, from the form *os*, and their motion referred to above developed the verb *oscillate*.

Trunnion is akin to *trunk*, and *muzzle* to *mumps* and *mutter*, but *mutiny* is to be related in origin at least to the root seen in *commotion*, and not to *mute*.

Truce is based upon the *truth* of the parties concerned, as *treaty* is that which is drawn out between them, akin to *tract*, whether of land or theology. But *treason* is that which gives over, for a consideration, like *tradition*, or that which is given down the ages. *Punctuality points* to the good soldier who, if disposed to look into the mysteries of *punctuation*, can study out for himself the relations between *period* and *exodus*, *comma* and *capon*, *colon* and *colic*.

There have been horsemen who *pommelled* it without thinking of *pomade* or *Pomona*, as they should have done. The fruit, *pomme*, gave

its name to the ointment, of which it was once an ingredient, and also to the knob on the front of the saddle.

Spur, *pollen*, and *pulverize*, the latter from *pulvis*, dust, are etymologically related,—violent motion, something blown about, is what underlies these and kindred expressions.

Here belongs *Pallas* Athene, that mythological lady who brandishes the spear in defense of her beloved Athens. *Pomona* and *Pallas* thus become the guardian deities of the two great divisions of our cavalry, those who hold on by the pommel, like the writer, and those who stick by the spur.

H. W. C.

MAN-OF-WAR LIFE TWO HUNDRED YEARS AGO.

In 1825 an octavo volume, of about three hundred pages, was published by Henry Knight, of London, which, after being reviewed in the *Quarterly Magazine* of the same year, seems to have fallen entirely out of the sight of those whom it should most interest. While it is not what is called a rare work, the writer has been able to learn of but three copies existing in the libraries of this country, although, doubtless, there may be many others.

The book is entitled "The Diary of Henry Teonge, Chaplain on board His Majesty's Ships Assistance, Bristol, and Royal Oak; Anno 1675 to 1679. Now first published from the original manuscript."

The book is particularly interesting to naval men, as giving an inner view of the early days of the service from which our own naval customs and regulations are derived, while it shows the use at that day of some practices which still prevail, as well as of many which are obsolete.

It was as fortunate as remarkable that the curious record was preserved, to fall, after the lapse of a century and a half, into the hands of a discerning publisher, instead of those of a collector.

The author of the Diary was, of course, a contemporary of Pepys and of Benbow, and his record, while not covering so extensive a field, is, in its way, as quaint and amusing as that of the busy, conceited, good-natured little secretary of the Admiralty.

The following extract from the publisher's introduction will give the history of the book:

"The manuscript, which is now first introduced to the public, had been in the possession of a respectable Warwickshire family for more than a century. Like many other records of individual adventures and opinions, it had descended, as part of an old library, from one generation to another, without attracting any particular observation. It was at length offered to the publisher for sale, as a curious volume that might interest some collector. He was led to think that its interest might be more extended. It appeared to him to present a very natural and faithful picture of customs and manners as they existed in the English navy at a period when it was fast rising into that importance

which was to decide the rank of this country among the nations of the world; and it further offered some very singular results of the experience of an observing and intelligent mind, expressed often with peculiar force and humour, and exhibiting some curious indications of the probable average state of morals and intelligence amongst the conforming clergy of the time of Charles II."

"In this age, when authentic illustrations of different former periods are eagerly sought after," our chaplain's remarks cannot fail to interest many beside naval officers.

From various sources the publisher collected facts in regard to Teonge sufficient to show that he held the living of Spernall Church, in Warwickshire; was a strong Royalist, adhering to the cause of Charles I. and his son through many trying years, and at an advanced age—for he was fifty-five, and had grown-up sons—was driven by debt and other difficulties to abandon his quiet country living for the dangers and discomforts of a sea-faring career, in which, however, the good-natured parson was supported by the happy faculty of looking at the bright side of things.

On the 20th of May, 1675, he left Spernall to undertake his first voyage, it appearing that his place was filled by his son Henry, who was Vicar of Coughton, an adjoining parish. In June, 1677, he returned to Spernall from his cruise. "Unhappily, the original cause of his absence from the proper sphere of his duties seems to have remained in full force at the period of his return. He says, 'Though I was glad to see my relations and olde acquaintances, yet I lived very uneasy, being dayly dunned by som or other, or else for feare of land pyrates, which I hated worse than Turkes.'"

Upon retiring from the navy Teonge again took up his parish duties, and died and was buried at Spernall in 1690.

His Diary is written without any sort of disguise, and he exhibits himself "not indeed as possessing any very constant sense of religious obligation, but, considering the laxity of the morals of the period in which he lived, and the society in which he moved, as affording a very respectable specimen of a sea-chaplain of that era."

"He enjoys his punch and his claret, and he revels in the most luxurious description of the good cheer by which he is occasionally surrounded; but he appears to have been constant in the observance of the offices of his calling, and on one occasion he exhibits a very spirited and commendable jealousy of any interference with his professional duties. His mind appears to have been remarkably acute and vigorous. He diligently observes whatever is new and curious, and brings to the subject a considerable share of book-learning, sometimes, indeed, inaccurate and ill digested, and frequently mixed up with a very singular portion of superstition, but altogether affording abundant evidence of his talents and acquirements."

Interspersed among his daily remarks we find a number of poems, some serious and some jocose, of a very considerable degree of excellence; and, judging from two epitaphs of officers which he gives, he wrote very elegant Latin.

His first voyage gives a view of the Expedition of Sir John Narborough against the Barbary States, in regard to which he really gives more information than the historical accounts do. Sir John on this cruise carried the Union Jack at the main, and gave the Tripolitans a severe lesson. An account of it may be found in Charnock, and in Campbell's "Life of the Admirals." Teonge, in keeping his Diary, made the text continuous, placing the days of the month upon the margin, Sunday being marked by the encircling of the date.

In the following extracts from the Diary Teonge's remarks are given verbatim and in quotation-marks, but it is hardly possible to disconnect the very excellent notes of the editor from the connecting text necessary to follow the author.

He begins his Diary with the pious motto, "Deus vortat bene!" and the date of May 20, 1675, when he set out from Spernall "with small accouterments" and mounted upon a "steede like that of Hudibras." He was clad in "an old coate and britches, and a leathern doublett of 9 yeares old;" and he mentions that his scanty stock of money was little more than enough to take him to London,—a six days' journey.

In spite of his poor attire he received a hearty welcome, with "bottells of claret," from his captain and lieutenant, and the next day went on board the "Assistance" frigate, of 56 guns, lying in Long Reach, where he is "entred on board Chaplen to his Majesty in his Frigott, under the command Capt: Will: Houlding."

After this formality he returns to London, and is occupied in preparing for sea; and to obtain means for doing so he pawns a cloak for forty shillings, and sells his horse, saddle, boots, and spurs for the sum total of twenty-six shillings more. With this he bought a small bed, a pillow, a blanket, and a rug, and having still a little left, "and being loath to go to sea too rich for feare of pyratts," he, accompanied by "his man," takes a coach to Blackwall, and so goes on board ship, where he "dranke part of three boules of punch (a liquor very strainge to me) and so to bed," in a "cabin much out of order." Two days after they drop down the river, many of the officers' and seamen's wives accompanying them, and there is much drinking of punch and brandy, and singing of "Loath to depart."

These were the first words of a song, the air of which seems to have been sounded upon the trumpets as part of the salute given to any superior officer or person of rank upon leaving the ship. Teonge often mentions it.

In a MS. "Discourse on Marine Affaires," preserved in the Harleian collection, the ceremony used on board upon the departure of any per-

sonage of high rank or command in the navy is fully described, and concludes thus: "Beinge againe returned intoe his barge, after that the trumpetts have sounded a Loathe to Departe, and that the barge is falne off a fitt and faire birthe and distance from the shippe side, hee is toe bee saluted with soe manie gunns for an adieu, as the shippe is able toe give, provided that they bee alwaies of an odd number."

The custom of saluting with an odd number of guns seems to have been observed from a very early period. Brand says, "All odd numbers were considered fortunate by our ancestors except 13. Salutes with cannon consist of odd numbers."

In the "Discourse on Marine Affaires," already quoted, is found "The odd number is in these waies of salute and ceremonie, soe observable at sea, that whensoever anie gunns are given in an even number, it is received for an infallible expression that either the Captaine, or Master, or Master Gunner, is dead in the voiage;" and at the funeral of such officers they "ringe his knell and farewell with some gunns—alwaies to bee of an even number."

As they near the buoy of the Redsands, the "Assistance" overhauls a merchantman, who shows no signs "of takeing the least notice of a man of warr—wee give him a shott, make him loare his topgallant (id est, put off his hat to us), and our Gunner presently goes on board of him, makes him pay 6s. 6d. for his contempt: abating him 2d. because it was the first shott."

The ship was three days in reaching the Downs, having dirty weather,—"the porpusses coming in heards on both syde the ship; a signe of a storme, the seamen say." Many are seasick on board, but our parson's "head very giddy, but no whitt sick."

He records that they found six other men-of-war in the Downs, all of whom saluted them with "7 gunns apeice," and then proceeds to state that in the morning he "mett a ragged towell on the Quarter Deck, which I soon secured, and soon Providence brought me a peice of an old sayle and an earthen chamber pott, all very helpfull to him that had nothing." This performance of the parson's would be called "menavelling" nowadays.

On Sunday they had no prayers, "by reason of the buisnes of the shipp." By the entries in the Diary it is evident, however, that divine service was held on board the "Assistance" quite as frequently as in the navy of to-day. Whenever the captain was for any reason absent no sermon was preached.

Ten days of very bad weather followed their arrival in the Downs, and when it cleared at last, the seamen "got into the shrouds and forecastle to examine causes, and to vew their forces, which then suffered mercyles martyrdom,"—which shows that populous heads and clothing were more common then than they are in her Majesty's service at present.

While waiting for a convoy of merchantmen, the captain and lieutenant, and their wives, accompanied by the chaplain, make little trips on shore, to Deal, Dover, and other places. The ladies appear to have been living on board all this time. Captain Holden at last receives sailing orders, with liberty to press men "from merchants and hoys—our ship being very ill mand."

The captain's orders were to go to Tangier, and, being the senior officer, he issues his sailing instructions, the last clause of which is, "If we loose company betweene this and Plimworth (Plymouth), our rendisvouse is Plimworth; if between that and Tangeare, Tangeare."

Before sailing they drink a bowl of punch, and learn that they are bound not only to Tangier but to Tripoli, and are to "convoy the Syppio, fraught with 27,000 dollars, to Scanderoonde."

A great deal of weeping goes on as the officers' wives make their final adieus,—that is, all wept "but our Master's wife, rather a virago," who was like "one that hath eaten mustard, her eyes are a little redd." The sly parson adds, "they were no sooner out of sight but they were more merry; and I could tell with whom too, were I so minded."

So they sail from the Downs, having in company the "Sypio," a Smyrna merchantman, and the "Mary," a "Maligo man."

They anchor off Dover, "to presse some men as wee went alonge," "where rod severall merchants when we cam in, but for feare of our pressing their men, stole away in the night."

In getting under way from Dover they salute the Castle with "3 cheers, 7 gunns, and our trumpetts sounding."

On the way down the channel the frigate falls in with "a Hollander, a man of warr." Upon tacking towards her, that vessel, "like a cowardly dogg that lys downe when he sees on com that he feares, lowres not only his top sayle, but claps his sayle to the mast, and lys by. This satisfys us, . . . and wee keepe on our course as before," the captain saying, "I wish I could meete with on that would not vail his bonnett."

This enforcement of salutes from foreign vessels was always insisted upon by the English, as a token of recognition of their sovereignty of the British seas, having been formally agreed to by all foreign agents and ambassadors as long before as the reign of Edward I. In the time of William and Mary the "General Instructions to Commanders in the Navy," Art. 31st, directs them "upon meeting with any ship or ships within their Majesties' seas (which for your better guidance herein you are to take notice they extend to Cape Finisterre) belonging to any Prince or state, you are to expect that in theyr passing by you they strike their topsail and take in their flag, in acknowledgment of their Majesties' soveraignty of those seas. . . . And you are further to take notice that in their Maj^{s} seas, their Majesties' ships are in no wise to strike to any: and that in other parts no ship of their Majesties' is to

strike her flag or topsail to any foreigner unless such foreigner shall have first struck."

At this time, owing to "good meate and drinke provided for us, and good company, and good divertissements, without the least care, sorrow, or trouble," and the fact that he had left his duns behind, the good man congratulates himself upon his good fortune in entering upon sea-life, and then proceeds to give us a specimen of the mode of punishment in use on board: "2 seamen who had stolen a peice or two of beife, were thus shamed: they had their hands tyd behind them, and themselves tyd to the mayne mast, each of them a peice of raw beife tyd about their necks in a coard, and the beife bobbing before them, like the knott of a crevatt; and the rest of the seamen cam one by one, and rubd them over the mouth with the raw beife; and in this posture they stood 2 howers."

The system of punishment for minor offenses seems to have rested upon the discretion of the captain. During the seventeenth century the most usual modes of punishment at sea were the *capstan*, the *bilboes*, and *ducking*. Teonge seldom mentions any one being flogged but the boys, though, doubtless, that punishment frequently extended to the seamen. The "Discourse on Marine Affaires" says, "a capstan barr being thrust through the hole of the barrell, the offender's armes are extended to the full length, and soe made faste untoe the barr crosswise, having sometymes a basket of bulletts, or some other the like weighte, hanging abowte his necke, &c." "The punishment of the bilboes is when a delinquent is putt in irons, or in a kind of stocks used for that purpose, the which are more or lesse heavy and pinching as the qualities of the offense is proved against the delinquent." "The ducking at the mayne yarde arme is, when a malefactor, by having a rope fastened undeer his armes and abowte his myddle, and under his breatche, is thus hoysed up to the end of the yarde: from whence he is againe vyolentlie lett fall intoe the sea, sometymes twyse, sometimes three severall tymes one after another: and if the offense be verye fowle, he is alsoe drawne under the verye keele of the shippe, the which is termed keel-haling; and whilst he is thus under water a greate gunn is given fyre righte over his head; the which is done as well toe astonish him the more with the thunder thereof, which much troubleth him, as toe give warning untoe all others toe looke out, and to beware by his harmes."

In France the same punishment—*la cale*—was not legally abolished until 1848. It was apparently never much in vogue in the French navy. Falconer, in his Marine Dictionary, second edition, 1771, says that keelhauling, in French *donner la grand cale*, was peculiar to and in common use in the Dutch navy.

Falconer speaks of running the gauntlet, in French *courir la bouline*, as in common use in his time, especially for theft or any dis-

graceful conduct, when the men could be relied upon to lay on well, each one having a piece of small stuff, knotted, and called a knittle or nettle.

In the naval service of Queen Elizabeth, "if anye one mann killed another, he was to be bownde to the dead mann and soe thrown into the sea. If anye one drew a weapon wherewith to stryke his captaine, he was to loose his righte hande. If anye drew a weapon within borde in anye waye of tumult or murder, he was toe loose his righte hande. If any one pilfered or stole awaye anye goods or monies from anye of his fellowes, he was to be thryse ducked at the bolt sprite, and then to be dragged at the boat sterne, and sett on shoare upon the next land with a lofe of bread and a cann of beere. If any one practysed to steal away any of her Majesty's shippes, the captaine was to cause him to be hanged by the heeles untill his braines were beaten oute against the shippes sides, and then toe bee cutt downe and lett fall intoe the sea. If any one slept in his watche, for the first time he was toe be headed with a bucket of water; for the second time he was toe be haled upp by the wrysts, and toe have two buckets of water poured intoe his sleeves; for the thirde time he was toe be bounde toe the mayne mast with plates of iron, and toe have som gun chambers or a baskett of bulletts tied to his armes, and soe to remaine at the pleasure of the captaine; for the fourthe time he was to be hanged at the bolt sprite, with a cann of beere and a biscott of breade and a sharpe knife, and soe to hange and chuse whether he woulde cutt himselfe downe, and fall intoe the sea, or hange still and starve. If anye one marryner or soldier stole awaye from her Majesty's service without lycense of his captaine, hee was to bee hanged. If anye one did mutinye aboute his allowde proportion of victuals, he was to be layde in the bilboes during the captaine's pleasure. As for all pettie pillferinges and commissiones of thatt kinde, those were generallie punished with the whippe; the offender being to that purpose bounde faste to the capstan; and the waggerie and idleness of shyppe boyes paid by the boatswayne with a rodde, and commonlie this execution is done upon the Mondaye morninges, and is soe frequentlie in use that some meere seamen and saylers doe beleive in goode earnest that they shall never have a faire winde untill the poore boyes be duelye brought to the chest: that is, whipped every Monday morninge."

There are plenty of us yet living and in the service who remember when this weekly performance took place,—the boys being brought to No. 1 gun instead of "the chest," the master-at-arms operating upon them with the "boy's cats," or his rattan, after their nether garments had been "clued down."

The chaplain never fails to mention the keeping of Saturday night, when they drank to "sweethearts and wives,"—a custom kept up to the present day, though not always with "boules of punch."

But to return to the "Assistance." They were eight days in reaching Plymouth. Here they anchor and "salute the Castle with 9 gunns; they answer with as many; we returne our thanks with 3 more."

At Plymouth the frigate was to increase the number of her convoy by a "fly-boat," or tender, and several more merchant vessels.

When the wind came out fresh and fair the captain becomes impatient at their dilatory movements, and "gives them a gunn to commaund them off, then sends another shott which came neare them, signifying the captaine's great anger; this brings them away."

Passing the dreaded Eddystone (which had then no light upon it, "a small rock not much larger than a 4th rate frigott, whereon many a good ship hath beene split"), and then the Lizard, they "bade adue to Old England."

In the Bay of Biscay they "lite of a Virginea man, and presse 3 stoute seamen," and the officers begin to "overhaule the seamen's chests, and order only 2 for a messe, and the rest to be staved, lest they trouble the ship in a fight." This will recall to many the ruthless raids of smart first lieutenants in these latter days upon ditty-boxes and other of Jack's treasured impedimenta.

During the passage across the bay they have rough weather and much trouble with the convoy, some of whom lose spars, while they are obliged to tow the misnamed "fly-boat." It is recorded that they saw "grampusses" here, one of which was "30 yards long."

As soon as they pass Cape Finistère, they come upon the cruising-ground of "ye Turkes," that is, the Barbary corsairs, and begin to look out for "Sally men," making ready their studding-sails and booms, and also making "nett worke to arme the quarter deck." On the day they pass the "Rock of Lysbon" the captain gave a grand dinner to the officers, and here is the *ménu:* "4 excellent henns, and a peice of porke, boyled in a dish: a giggett of excellent mutton and turnips: a peice of beife of 8 ribbs well seasoned and roasted; and a couple of very fatt greene geese: last of all, a greate Chesshyre cheese. His liquors were answerable: viz: canary, sherry, Renish, clarett, white wine, syder, ale, beare, all of the best sort: and punch like" (as plentiful as) "ditch-water; with which wee conclude the day and week in drinking to the Kinge and all that wee love; while the wind blowes fayre."

The day after this Gargantuan feed our hard-headed parson says, "I preacht a sermon; text Luke viii. 15," and in three days thereafter they celebrate their arrival at "Tangeare with noble bowles of punch and quarts of brandy."

Tangier, the dowry of Charles's queen, was soon to be abandoned and dismantled by that sovereign. In 1683, Lord Dartmouth was made captain-general of the English forces in Africa and governor of

Tangier, which then bore the same important relation to British Mediterranean commerce that Gibraltar does now. Owing to the difficulties about appropriations between Charles II. and the Parliament, the governor was directed to utterly destroy the strong fortress of Tangier, which he did so effectually (blowing up the mole and demolishing the works) that the harbor was entirely spoiled, and the Moors, into whose hands it relapsed, were forced to entirely rebuild.

A curious idea of the king's was to direct a number of new crown-pieces to be buried in the ruins, so that, if the city was ever restored, there would be evidence of its having been under the English crown.

The chaplain accompanied the captain and the doctor of the frigate in an inspection of the city and fortifications, and describes them at length, as we may say here once for all he does every place they visit, besides giving a general account of the countries surrounding the Mediterranean, some of which is curious reading. After a long and fatiguing inspection of Tangier, the party were "invited into a fayre room by Capt: Charles Daniell," in charge of the forts, "and noblely entertayned." They appear to have consumed "two botts: of claret: severall bottells of wine: rost beife cold: Westfalia polony pudding: parmezant: cucumbers, musk mellons, sallets, and a reive of Spanish onions as thick as my thigh; stowed us with good wine," and, at last, "sent one of his corporalls to see us safe to our pinnace,"—a very necessary precaution, we should judge, especially as he mentions that they got on board "something late."

Next day they sail for the Mediterranean, having left the "fly-boat" and the convoy, except the "Syppio" and the "Unity," and pass "Giblitore" and "Maligo," touching at "Aligant." On this passage they "begin to exercise our young men to the muskett, and alsoe made a sayle for the starne of the ship, called a water-sayle, not usuall. After seeing "strainge sport here this day in massacrein of seven bulls, which they call bull-baiting," they sail again, and come to the "edge of the Gulfe of Lyons; a very dangerouse place for stormes. . . . This day we have a fayre on our Quarter Deck: viz: our pursor opens his pack, and sells to the value of £30 or more, shirts, drawers, wascots, neck-cloats, stockings, shooes, and takes no money for them; this is newes." He often mentions this serving of clothing subsequently, from which it appears that slops were charged to the men's accounts, just as is done at present.

He now preaches several sermons upon the same text, Romans viii. 28, which certainly affords great scope, and also gives the potations consumed on Saturday night most scrupulously. Again, too, the "poor boyes" are mentioned. "This morning (as 'tis the use at sea) is Black Munday with the boyes, who are many of them whipt with a catt with 9 tayles for their misdemeanurs by the boarson's mate." It being calm, the captain goes on board the "Unity" to dine, and is saluted with

five guns on coming back, "returned with 3; the Unity thanks us with 1 more."

Off Cape Bon they see some strange sails, and "send down chests and hammocks to prepare for a combate." Finally, they arrive at Malta on the 1st of August, where he naturally finds it "verry hott." A boat boards them to ask for "a bill of health for prattick," whereupon stout Captain Holden tells them "he had no bill but what was in his gunnes mouths," and stood in and anchored, waiting "the governour's leisure to have leave to come on shore, which was detarded," not on account of his answer to the officer of pratique, as we might reasonably suppose, but "because our Capt: would not salute the cytty, except they would retaliate." At last the English consul comes off with the matter arranged, and "our Capt: tooke a glass of sack, and drank a health to King Charles, and fyred 7 gunns: the cytty gave us 5 again, which was more than they had done to all our men of warr that came thither before. This being done, our Captaine sent his lieutenant and some more of our gentlemen to salute the Grand Master, and to tell him that he would waite on him the next morning." Nicholas Cotonier was then the Grand Master, and during this very year Charles II. sent him a letter of thanks for his civilities to his admiral and his ships. Of course, Teonge gives a description of Malta, and mentions that many of the knights visited the "Assistance," "with whom I had much discourse, I being the only entertainer, because I could speak Latine, for which I was highly esteemed, and much invited on shoare again. This day, to shew our strength, all our ports are opened and all our gunns thrust out, as though wee were going to fite; and our ship cloathed throughout with new wast-cloathes and new sayles." But the next day "our greate gunns are all drawne in again, and our ports corked up, and we are providing to sayle." He adds that the ship was

> "New rigg'd, well stored with pig and goose-a,
> Henns, ducks, and turkeys, and wine call'd Syracoosa."

The vessel then joined Sir John Narborough's fleet off Tripoli, and after some sounding and reconnoitring, on the 14th of August, "about 3 of the clock, wee com all to an anchor within shott of their cannon, and they make not on shott at any of us." On this occasion the admiral issued a general "order for sayling," and "signalls when I woulde speake with any commander." "My pendant at the mayne top masthead for Sir Roger Strickland, of the Dragon; fore yard-arme for Capt: Houlding, of the Assistance, &c., &c." The orders terminate with, "In case of any inevitable distress befalls any on, that they cannot keepe this sea, then Malta is appoynted for fitting and meetinge againe; where orders will be lodged for their dyrections. And so God dyrect us!"

Skirmishes and boat-captures were frequent, but in spite of vigilance the Tripolitans ran several of their cruisers out clear of the blockading squadrons; "they clear outsayled us all. Wee have rub'd our ship to sayle better against more of them com out." He also says that they escaped on account of mists and fogs, brought on for the purpose by "Marrabott sorcerers." It was during this blockade that Sir Cloudesley Shovell achieved the success mentioned in the introduction. In the mean time the "Assistance" was ordered to cruise to the westward. On this occasion the chaplain "drank Mall Walker's bottell," whatever that may have been. It inspired a poem upon the capture of a Moorish vessel, of which the following are some stanzas:

"Wee fall upon the Turkes as with
Gholya's weaver's beame,
Our greate gunns and our musketteares,
And our petarreroes humming;
The bullett's flew about their eares—
They thought the Devill was coming.

* * * * * * *

"God blesse King Charles; the Duke of York;
The Royal family;
From Turkes and Jewes that eate no porke
Good Lord deliver me."

As several of the corsairs had escaped, the admiral became uneasy lest they should injure the Levant trade, and detached the "Assistance" and two others "to the Arches to persue the Turkes." Our sailors at the present day call the Grecian Archipelago "the Arches." Thence the "Assistance" was to go to Scanderoon, the others to Smyrna. The navigation of "the Arches" was set down as a "dangerouse voyage," as it was always considered until steam and light-houses robbed it of its terrors. They stopped at Zante to water, and appear to have had a royal bout upon "Ribolla," the strong Zante wine. Teonge inserts an epic upon the conflict for superiority between "Ribolla" and their old friend "Syracoosa." The result of the contest was that

"Som by their friends were carryd to their hammacks,
And bed rid lay, with paine in syds and stommacks;
With fyery faces and with akeing braine,
Their hands all durt, theire pulses beate amaine;
Which, when the Doctor did but touch, would spew
Good Syracoosa and Ribola too.

* * * * * * * *

"Som so outragious that the corporall
Was forced to cloyster them in bilbow's hall;
Som ceas'd to th' main mast do their backs expose,
To th' nine tayled catt, or chirriliccum's bloes;
Som ready to be duct, som left ashoare,
And many mischiefs I could tell you more."

This describes a "general liberty" and its consequences in very recent times, with the ship's corporal filling up the "brig" with delinquents in double irons. One Skinner, one of the crew, for going on shore without leave, "had his leggs tyd together, his hands tyd to a greate rope, and stood on the syde of the ship to be hoysted up to the yard arme, and from thence to drop downe into the water 3 times," was interceded for by the officers, and his punishment remitted, for the singular reason that he was "known to be a coockould, and had injurys enow already" at home. This is certainly a unique plea in mitigation of summary military punishment.

Soon after leaving Zante, and off "Candia, in a brave gale," he recounts how the captain sent for him, the lieutenant, and the "Pursor and others" to dine; which they did, lying on deck "around the beife," skylarking like old-fashioned steerage officers, and at last getting all thoroughly wet by a sea breaking in one of the ports, "which caused much myrth."

Between Candia and Cyprus they make two sail, which they suppose to be the escaped Moorish frigates, and the "Assistance" is cleared for action, "our mayne yard and fore yard slung with chaynes, quarter deck armed, everything ready. They stired not at all, but lay ready to receive us. Our Captaine commaunds to put out our ancient jack and pendant: says he, 'We'el show them what wee are.' . . . Wee with our trumpetts sounding and hayling them, steered our course directly between them." They turned out to be Maltese, after all. "Maltees by their white crosse, and they know us to be English by our red crosse." Salutes pass, and they spare the "Maltees" some "barrells of powder." "This day I hanselled my new cassake, but had no time for prayers."

On the 4th of October they sight "Cyprus, that famous iland, once in the possession of the English." The whirligig of time has given them possession again. Their stay at Cyprus was short, as the captain "denyd to pay anchorage."

On arriving at Scanderoon, then a great port on account of the overland traffic, and possibly to be so again if a railroad is built to the Persian Gulf, they have much saluting, and sounding of "Mayds, where are your harts?" after which they begin to "mend ship, fetch ballace, and carry empty caskes on shoare to be mended and sweetened," while about a hundred men "goe a woodding." Those left on board "scrape and tallow the mastes and the ship, tallow all the decks" (no holy-stones then), "scrape our quarter deck, mend sayles, &c." They also go to general quarters, for the benefit of "the chiefe Caddi and the Gaw of Scanderoonde," who visit them. The ship was "put in a posture as if wee were going to fight, viz: our trumpetts sounding, pendants, all colours, flying; our gunns all run out of their ports; garlands lay in all places filld with shott, round and dubble headed;

tubbs full of cartrages and wadds stood by, and bowles full of water; a fyle of musketteers stretched from the stand to the greate cabin, &c."

On the 5th of November, in honor of the day, they have a great dinner, drink "racckee, and good luke sherry, in healths to King Charles II," and fire "13 gunns, the last with a shott in her." "Novr. 9th, I was invited to dinnar with our Captaine, and our Doctor, our Pursor, Capt: Mauris, and Capt: North, to our Consull's on shoare: where we had a prince like dinnar: and every health that we dranke, every man broake the glasse he drank in; so that before night wee had destroyed a whole chest of pure Venice glasses."

The corsairs are heard of as making prizes, and the repairs are hurried on, but before they are ready for sea the "boatswayne dyed suddenly, and this afternoone I buryd him in the Greek church yard. He was nobly buryed, and like a souldyer. He had a neate coffin, which was covered over with on of the King's jacks, and his boarson's sylver whisle and chaine layd on the top (to shew his office), betweene 2 pistolls crost with a hanger drawne. At his going off the ship he had 9 gunns, fyred at a minnut's distance, and 8 trumpetts sownding dolefully, whereof the 4 in the first ranke began, and the next 4 answered: so that there was a continued dolefull tone from the ship to the shoare, and from thence to the grave. Halfe the ship's company with their musketts in the right posture going after the corps, with all the officers of all the ships that were there. I myself going immediately before, and the trumpetts before me. . . . When he was buryd he had 4 peales of muskett shott, and as soone as we were out of the Church yard the trumpetts sownded merry levitts all the way. His name was Richard Capps, of Dedford."

The day after the funeral the frigate sails, having many visitors to bid good-by, and, as they left, "we gave them 3 cheares and 11 gunns, every on having dranke St. George in a rummar as he went over the ship syd." Teonge often mentions "St. George" as the parting toast.

After leaving Scanderoon he, as usual, gives a description of the place, and says it is not salubrious for Englishmen, either "by reason of the unholsomenes of that ayer, or their owne extravagancy in distempering themselves with those country wines." Once more at sea, "the boarson's goods are this day sould at the maine mast, at an extreame deare rate:" and, in "the afternoone the Captaine calls all hands up; and called Mr. Nathaniell Berry, and gave him authority to exercise the office of boateswaine" (Mr. Teonge never, by any chance, spells this word twice alike, any more than he does Gibraltar), "and bad all take notice of it; also gave him a cane, and bad him use it with discretion. After that he called Robt. Tyndall into the greate cabin, and made him master's mate."

Another gale is now recorded, in which their convoy "was all squandered on from the other." With his usual eye to the flesh-pots,

Teonge mentions that "good beife and porke, which stood in the head of the ship to be watered, was all driven away, tubbs and all." *We* should think "the head" a strange place for the "harness cask." On December 24 they "washt decks for Chrismas." "Chrismas day wee keepe thus. At 4 in the morning our trumpetters all doe flatt their trumpetts, and begin at our Captaine's cabin, and thence to all the officers and gentlemen's cabins; playing a levite and bidding good morrow and happy Chrismas. After they goe to their station, viz.: on the poope, and sound 3 levitts . . . we goe to prayers and sermon." The captain had all the officers to dine,—"excellent good fayre, . . . and ended the day with much civill mirth." The next day he preaches a sermon "on Jobe's sonns feast."

Some time after this they approach Malta again, and "discover a small sayle creeping closse to the shoare. Wee hayle her with a shott—she would not budge; we sent a 2nd, and then a 3rd, falling very neare her; then the lieuetenant cam aboard us and payd for the shott: It proved a pittifull Frenchman." The plague was then raging in Malta, and they leave at once, to convoy some vessels "towards the Straits mouth," encountering on the passage "very greate grampusses." One "could not be less than 50 yards in length. Our Captaine began to be much afraid of her—but at last she went away, throing up the water out of her nose higher than the topmast." Dismissing the convoy they return to Malta, but cannot land. On the anniversary of the martyrdom of King Charles I. they hoisted jacks and colors at half-mast and fired minute-guns, and the "trumpetts sownded well-a-day."

The parson is much interested in the fleet of Maltese galleys, "a gallant show," and the English "Admiral arrives from Trypoli, when the Maltees salute him with 45 gunns." He answers with so many "wee cannot count. Fyre and smoake for 2 howers." Discipline is not neglected. "David Thomas and Marlin the coock, and the Master's boy, had their hand stretched out, and with their backes to the rayles and the Master's boy with his back to the mayne mast, all looking on upon the other, and in each of their mouths a maudlen-spike, viz: an iron pinne clapt closse into their mouths, and tyd behind their heads: and there they stood a whole houre, till their mouths were very bloody; an excellent cure for swearers." The "Tripolees" failing to keep the late treaty, Sir John sails again, with all the fleet, "except the Dragon, on the carrene," "wee are all for Trypoli, and resolved for mischief." The "Trypolees" and the "King of Tunis, who, it is related, hath 700 concubines," are so overcome by the appearance of the fleet that they at once come to terms. They pay 80,000 pieces of eight, and release all slaves belonging to the crown of England. "'Tis the most honourable peace that ever yet was made with the Turkes."

After this satisfactory settlement the fleet dispersed to cruise, the "Assistance" going to the Levant again. Our parson appears to have

come into some money about this time, for he chronicles the fact that the tailor made him a suit of clothes, for which he himself made the buttons, and "I made my sheetes: and this is the first night that I lay in sheetes since I cam from England." By the time they arrive at Scanderoon again they are on very short commons, their "beife being flung overboard: for the meate was so bad that they chose rather to eate bread dry. That was much to our Pursor's discreditt." A Maltese man-of-war came in with them "of 16 gunns and 30 petarraroes: whoe having taken some sikes from the Turks on these coasts, cam to an anchor, and put out a white ancient and fyred a gunn: to signify that the Turks might com to him, and redeeme, or buy his prizes of him."

A long and curious passage in the Diary is the description of a trip to Aleppo, which the parson made with Captain Holden,—containing most surprising adventures,—and upon which he set out with some trepidation on account of bad omens,—"a crickett sang merrily at the foot of the mizon, and there was also a death watch heard in the gunn room. Deus vortat bene." A description of a grand dinner at Aleppo includes the list of thirty-six principal dishes.

When they leave the Levant again the chaplain gives a full description of Egypt, and commences a series of sermons, lasting some weeks, on "the plague of froggs." He says of "the river Nylus," "there are posts sett in severall convenient places to observe how high the waters doe rise. And tis observed that if they overflow in ordinary places above 17 cubits, then tis too much: if under 15 the moysture will not be sufficient: eyther of these is prejudiciall. The overflowing of this river, and at such seasons yearly, is on of the woonders of the world. Severall probable conjectures have been made at the reason of it, but the most probable may be this: There is in Prestar John's country (as som doe affirm) the head or rising of this river (tho' others strive to fetch it from the Lake Zembre, which lyes farther south), near to the which are those hills called Lunae Montes, on the which falls abundance of snow. At the melting of the which, and to prevent too violent course of the waters, especially at that time, the inhabitants have made several damms, and sluces, and ponds to catch the water in, partly for their own convenience. . . . For the maintenance of which damms and sluces the country of Egypt have (time out of mind) payd yearly a greate trybute to Prestar John; which payment being not longe since detayned by the greate Turk, as an unnecessary charge and as an imposition, . . . Prestar John gave commaund to cutt all the damms and sluces, which presently drowned all the land of Egypt for 3 yeares: so that the Turk was forced to begg his peace with Prestar John, and give not only the olde tribute, but a greate summ of moneys, also more for the repayres of the damms and sluces."

Of the Isthmus of Suez the Diary remarks, "som have attempted

to digg through that neck of land into the Red Sea, but have bin forced to forbeare, having considered that the sea would not only alter the waters of Nylus but also drowne all Egypt, the sea lying 3 cubitts higher." Surely M. de Lesseps never saw this statement.

After visiting Malta and Leghorn, and invariably making tremendously long passages, on July 25, 1676, they are bound, "God willing, for fayre England. Boone voyagio! Our ship is very leakey." Soon after they get to sea they meet five sail of men-of-war, Frenchmen, whose admiral sends, with his compliments, to know if they need anything. The captain sends back word, "nothing that he would be beholding to such roagues as they were for," which the chaplain seems to think a very proper and spirited answer. On the 5th of August they "have a small gale, ahead," during which they "goe as lawyers doe to Heaven." In the Gulf of Lyons they "discover 8 sayles," which turn out to be Algerine men-of-war, and the frigate makes ready for a fight. "But when wee cam something neare them, their Admirall sent his boat to us, and commands us on board to give him account what we were, and whither bound. Our Captaine, being very angry at such a message, commands to runn out all our gunns: but the Argereenes, not well liking that sight, tackt from us as fast as they could. They took a Venetian of 36 gunns this morning."

In regard to the number of guns then carried by different classes of vessels, we find, on referring to the list generally known as Pepys's, that an English "36" would only carry "sakers and lite sakers," the latter only 6-pounders. From the same source we learn that the "Assistance" carried 48 guns, of which 22 were culverins, 20 sakers, and 6 light sakers. She carried 230 men, was 102 feet long, 31 feet beam, drew 15 feet of water, and was of 555 tons, being classed as a fourth-rate.

The dreaded Gulf of Lyons did not allow the "Assistance" to escape without another gale, "which forced them to loare the yards, and splitt the mayne sayle: in which trouble Phynny Shreuesbury brake his legg betweene the mainemast and mayn yarde, and Roger Lyswell fell from the yarde upon a gunn." They were forced to scud for many hours, passing "Minyorke" and coming "closse under Porte Mahone, where wee ly by," as many a ship has done in a northwester since Teonge's time.

What the parson sees himself he always describes remarkably well, but he cannot leave the Mediterranean without giving us some more marvels about Africa, derived from books apparently. "In the south part of Africa is scarce anything remarkable, save that there are men and beasts of strange shapes; as, som men with heads like doggs or hoggs, some with no head; som with only one large legg and foote."

In a work published in 1664, without the author's name (which probably afforded Teonge these statements), there are mentioned, among the prodigies of Fez and Morocco, the "Sciapodes, that have such a

broad foot, and but one, that they cover their heads from the heate of the sun and the violence of the showers by lifting this up over them."

At Tangier once more, the "Assistance" has "no prattick, which wee take ill from English men." The chaplain evidently wanted to find Captain Daniell, who so "noblely entertayned" them when they first came out. They "take in fresh water and corke the ship, having nothing else to doe." Passing on to "Cales," they are again refused pratique, and "could get nothing, not even wine," so they bear away for England, "to ease our ship which is so leakey, striking 14 of our gunns into the hole."

They next encounter what really seems to have been a very heavy gale, losing spars, sails, boats, and washing "on of the seamen clean off the crotchett yard." The cross-jack-yard was then a lateen affair.

"At last our captaine and the rest, consulting, made a shift to put up a small fore sayle, and put the ship before the wind. Many greate seas broke over us all this night, and wee have little hopes of any safety yet. Wee stryve for Lysbon, in Portugall." When the gale had somewhat broken and they were engaged in repairing damages, they were overhauled by a ship, which they "discover to be a Turkish man of warr: we were in a poor condition to fight, our ship being ready to sink under us, and had certainly done so in an hour's time if she had not been pumped. Wee all leave our busines wee were about, and make ready what greate gunns wee could in that short time, and every on that could tooke up a muskett. Shee proved an Argereene, and took us for a Portugall; wee hayle her, and their boate coming on board shewed her passe. The lieftenant that cam was an English renegado, whoe told us they did not suspect us to be English, but that they cam up so boldly intending to lay us on board: but once seeing the syd of our ship, they whisht themselves farther from us. They had 400 men on board. At sunn setting, to our greate joy, wee see the Rock of Lysbone." At Lisbon they were received most inhospitably, but effected some temporary repairs, and then sailed once more for England, and after a rough passage they got their "pylate aboard," and finally moored at Dedford, in the Thames.

Friday, 17th November, 1676, "wee are payd off at Dedford; where wee leave the rottenest frigot that ever came to England."

The Diary kept by Teonge during his second voyage is much shorter than that of his first, but more interesting in a naval point of view, as it enters in courts-martial, mustering of the ship's company, ceremonies, etc., much more particularly than in the first record of his seafaring.

TEONGE'S SECOND VOYAGE, 1678.

"Haveing (by God's blessing) finished my first voyage in the Mediterranean seas (wherein I gott a good summ of monys, and spent greate

part of it), I resolved to make another voyage, with full intention to keepe what I could gett. My desyre was to visit the western parts (if possible I could), and finding out Captaine Antony Langston, whoe was promised a ship for Virginea, with little perswation, I engaged myselfe to goe with him whethersoever he was commanded."

On the 18th of March Teonge received a letter from the captain, to say that his commission was granted, and the parson at once set off, by the "coatch waggon," reaching "the Bull in Smythfield" on the evening of April 3, 1678. Waiting upon Captain Langston, he was told that another chaplain had got the commission for his ship.

It appears that the bishop of London had at that time the appointment of chaplains in his hands, and our energetic friend so followed up, waylaid, and importuned that prelate, that after a few days he had the matter righted, and his appointment to Captain Langston's ship made out. In the mean time the captain took him with him to White Hall, "where (after a little stay in the Long Gallery) our Capt: came to mee and told mee I should kiss his Majesty's hand. He had no sooner sayd so but the King cam out: my Capt: presented mee to the King, saying, An't please your Majesty, this gentleman is an old cavalier, and my Chaplen. I kneeled downe; he gave me his hand. I kist it, and said, Pray God blesse your Majesty! He answered, God blesse you botth together! twice; and walked alonge the Gallery his woonted large pace."

Charles's quick step has been mentioned by the Marquis of Halifax and others, besides Teonge. We are left to infer that this presentation and gracious reception had something to do with the bishop's favorable action.

The "Bristol," to which Teonge was appointed, had already dropped down the river to the Hope, so "Mr. Rich[d] Dawes and myselfe went on board a sandwich hoy, where wee had lousy lodgings, and as bad fare." When they got to Sandwich they were dismayed to find that their ship had proceeded to the Downs, from whence she returned to Gravesend, to embark soldiers. Our poor parson, impecunious as usual, had now several weary days of trudging back and forth after her; but at last, on May 2, after many tribulations, and with "weary leggs," he at last found himself on board "his Maj[ty] ship the Bristoll, where our Captaine and all the gentlemen did much rejoyce, in punch and brandy, at our safe arrivall."

By Pepys's List we find that the "Bristol" was a fourth-rate, 104 feet long, 31.8 beam, drawing 15.6, 547 tons, 230 men, and 48 guns; viz., 22 culverins, 20 sakers, and 8 little sakers. She was built at Portsmouth, in 1653.

The number of men in a ship's company was of great importance to the chaplains and surgeons, as their pay, from ancient usage, was in part made up by deducting four pence per month from the wages of

each man for the chaplain, and two pence for the surgeon, in addition to the fixed pay. This was called their "groats and tuppences," and the system was continued until the end of the eighteenth century, when the sea pay of all officers was made net, without any addition or deduction whatever. Charnock says that in 1691 "the surgeon's imprest was," by the navy board, "made a free gift, for their encouragement." In 1694, Charnock further states, surgeons of dock-yards received fifty pounds per annum and "travelling charges."

It is not so many years since pursers in our navy were paid according to the rate of the ship in which they were serving.

But to return to the "Bristol." On the 4th of May "the Prick Master comes on board, and enters me from the date of my warrant from the King." Teonge several times mentions this mustering officer inspecting and checking the roll of the ship's company, not only at home, but in the Mediterranean.

May 5, Sunday. "Prayers, but no sermon; our Captaine dyneing on shore." We may remark here that the chaplain appears never to have preached a sermon unless the captain was present.

For some considerable time after Teonge joined her the "Bristol" was engaged, with other men-of-war, in carrying soldiers to Scotland, —"all fraite with lobsters, viz: redcoats." The ship returned to the Downs, and he mentions, as he often does, a serving of clothing to the ship's company in these terms: "a fayre kept on the q^{r}. deck of caps, neck-cloths, wascotts, drawers, shirts, stockings, shooes, &c. You could but ask for what you wanted, and 'twas put into your hands: but mark the end on't." That is, it must be paid for in the end. Then follow such entries as this: "Severall of the men of warr train this day," which is plain enough; but what means "The scolding woman was well washed this day"? The cucking-stool, or ducking-stool, for scolding women was in use on shore. But Teonge nowhere mentions any women as permanently on board any of the three men-of-war in which he served. There may have been for all that; for it is within the memory of some officers still living that a certain number of women were allowed, as laundresses, on board of men-of-war in our own navy.

He also speaks of visiting the "Charles II.," "a ship of the first rate and of greate force, carrying 96 gunns and 710 men." This ship was built by Mr. (afterwards Sir A.) Deane, a well-known naval constructor. Pepys says that in 1666 Deane was the first to accurately calculate the draught of a vessel before she was launched, and that in some of his vessels he made a great step in advance, as they carried six months' provisions, and their lower-deck guns were four and a half feet from the water. This was an enormous advance upon the men-of-war of Henry VIII. and Elizabeth's time. The "Mari Rose," during the former reign, was lost near Portsmouth "by a little sway of the ship in casting about, her ports being within sixteen inches of the water;"

she filled, was overset, and lost. Port-holes, as well as working to windward, or tacking, were then comparative novelties.

Referring to the navy list, prepared by Pepys, we find that the "Charles II." was 128 feet long, 42.6 beam, and drew 21 feet. Twenty-eight of her guns were culverins, 26 demi-culverins, and the rest sakers.

The "Bristol's" next service was to take "Sir Henry Goodridge his regiment" to Ostend, and, returning to the Downs, on July 25 "coms the ill tydings that our ship's voyage (which all this while was intended for Virginea) was alterd, and wee are now ordered to goe into the Straits. Wee are all discontented."

The next day they sail, "all the men of warr in the Downes, a brave squadron, for Portchmouth, tis sayd. But all in our ship goe with sorrowful harts, haveing lost soe brave a voyage, which wee so long expected, and to bee so suddenly commanded into the Straits, so unprovided of necessarys for that voyage, haveing not the least time to take leave of our acquaintance, and also so ill man'd and gunn'd: tis trouble enough." So we see from this that *growling* is no new thing in the navy, and also that then, as now, "Jack growls, but he goes." Upon reaching Spithead the prickmaster musters them again, on August 2, and we learn that on that day "Isaac Webb stood tyd to the geares an howre, and had *speculum oris* placed in his mouth, for saying to a seaman, in the Capt.'s hearing, 'Thou lyest like a sonn of a ——!'"

While the ship is in dock at Portsmouth "to be cleaned," many of the men, "because wee were sure to goe into the Straits, ran from the ship." Of late years naval seamen have always preferred the Mediterranean cruise. So we see a great change here. In Teonge's time there was plenty of hard work and fighting, while in America was novelty and some license. "A seaman had 29 lashes with a cat of 9 tayles, and was then washt with salt water, for stealing our carpenter's mate's wife's ring."

It is evident that there was not near so much flogging in the navy at that time as there was a century later. Teonge, who was a painstaking and careful diarist, seldom mentions flogging. When the other punishments, such as ducking, became disused, flogging was substituted, until it became the only punishment besides confinement and death.

After leaving the dock and anchoring at Spithead again, they were detained there by equinoctial gales of unusual severity, and they have a number of bad omens for the success of their voyage, the old seamen, or shell-backs, freely drawing all sorts of bad auguries. The term for these old seamen was then "Puggs," and another chaplain, who kept a journal of a cruise in the "Centurion," in 1691, in speaking of a gale in which there was great danger, remarks, "The behaviour of our Puggs (old seamen) at y^e^ time was not a little remarkable; some few of y^m^ would pray, but more of y^m^ curs'd and swore lowder than y^e^ wind and

weather. I can't forbeare writing one instance of y^e^ natur, and that is in y^e^ story which was told me y^e^ next morning of George y^e^ Caulker and old Robin Anderson. Poor George, being very apprehensive of his being a sinner, and now in great danger of his life, fell down upon his marrow bones and began to pray, 'Lord, have mercy upon me!' &c., and so on to the Lord's Prayer. All y^e^ while old Robin was near him, and between every sentence cry'd out, 'Oh, you cow! Zounds! thou hast not got the hart of a flea!' Poor George, thus disturbed at his devotion, would look over his shoulder, and at y^e^ end of every petition would make answer to old Robin with a 'G—d d—n you, you old dog! Can't you let a body pray at quiet for you, ha? A plague rot you! Let me alone, can't yee?' Thus y^e^ one kept praying and cursing and t'other railing for half an hour, when a great log of wood, by y^e^ rolling of y^e^ ship, tumbled upon George's legs and bruised him a little; which George, taking upp into his hands, and thinking it had been thrown at him by old Robin, let fly at y^e^ old fellow, together with a whole broadside of oaths and curses, and so they fell to boxing. I mention this only to see the incorrigible senslesnes of such tarpaulin wretches." Would our old quarter gunners and mastmen of thirty years ago have behaved in any other way?

Bad weather and long detention on board ship seems to have increased Teonge's superstition, and this although he was of an unusual amount of education for the times. He says, "We still have ill luck; I am afraid of an unfortunate voyage; for this day our Pursor, Mr. Gelly, is dead at Portsmouth, and our Lieuetenant is very near it."

At last, on September 25, they sailed, the convoy consisting of six men-of-war and about one hundred merchantmen. During the passage across the Bay of Biscay the chaplain appears to have been engaged in the unclerical operation of "making cartridges for the Captaine's gunn and for my owne staff gunn, and som for musketts." "Wee barracade the quarter deck with an old cable, to keepe off small shott, and a good shift, too." The quarter-deck and poop, being then so much raised, formed a sort of citadel. A small vessel which they encountered, no doubt confused by the imposing fleet, ran on board "the Castle fyre-ship and broake off her fore top mast and her owne bolt-splitte. The weakest goes allways to the wall." The chaplain's reflection is not new, but it always holds good, especially at sea.

On "November the 1st, at night, we begin Chrismas in a boule of punch."

Lord Mordaunt, afterwards the celebrated Earl of Peterborough, was a passenger in the "Bristol" to join Sir John Narborough, having been devoted in his early life to a naval career; and Teonge mentions that on November 3, "taking occasion of my not being very well, he would have preacht, and askt the Capt^nes^ leave last night, and to that intent sate up till 4 in the morng. to compose his speech. . . . All this I my-

selfe heard in agitation; and, resolving to prevent him, I got up in the morning before I should have done, had I respect to my owne health, and cam into the greate cabin, where I found the zealous Lord with our Captaine, whom I did so handle in a smart and short discourse that he went out of the cabin in greate wrath. In the afternoone he set on of the carpentar's crewe to woorke about his cabin; and I being acquainted with it, did by my Captaine's order discharge the woorkeman, and he left woorking; at which the Reverent Lord was so vexed that he borrowed a hammar and busyed himselfe all that day in nayling up his hangings. . . . From that day he loved neyther me nor the Captaine. No prayers for discontent." (This nobleman was not undistinguished as a naval officer, and, early embracing the cause of the Prince of Orange, he rose to be First Lord of the Treasury and Earl of Monmouth, and, finally, Earl of Peterborough. In 1705 he was commander of the forces sent to Spain to support the Archduke Charles, where he showed great military ability. He was of an excitable nature and peculiar in his manners, but filled a very considerable position in his time.)

During the cruise Teonge, as on his first voyage, never fails to chronicle the Saturday nights and the various dinners to which he was invited, giving a list of the viands and liquors.

On November 22 they "com to an anchor in Cales Roads." "Never long that comes at last." They had had twenty-seven days' passage. "We find the Pearle and the Ruby, English frigotts," and "9 Hollanders. Their admirall saluted us with 9 gunns, the vice with 7, the Rear with 5; wee answered so." The frigate "Ruby," spoken of above, is called on the lists "French Ruby," having been captured from that nation. Vessels of the navy were often officially borne as "Prize" also, such as the "Tyger prize," a ship of forty guns, taken from the Moors.

When the "Bristol" was leaving Cadiz she fouled another ship in getting under way, and suffered some damage. The captain, "disliking some passages, had confined our Master to his cabin as soon as we came to Cales," which may account for the disaster, for many of the other officers in the navy of that time were by no means experienced seamen. The master, among other derelictions, "had left a candle burning in his cabin, which fyred a bunch of rosemary, and had like to have fyred the ship: and this also I take to be an ill omen of a bad, troublesome voyage."

Charnock gives, in p. 74 of the preface, a lament of Mr. Gibson, in his "Report," over the want of "tarrpawling commanders in the navy royall."

The parson continues, apropos of the collision, "the Lord Mordant was instrumentall, and he hath left us and is gone into the Rupert; and his Sunday's worke is com to nothing." The parson seems to

attribute my Lord's lubberly work as officer of the deck to his having presumed to infringe his prerogative in the matter of preaching.

The "Bristol," with a convoy, touches at Tangier, and then they pass "Giblitore" and "Maligo," trying, fruitlessly, to entrap "two Argereenes," who hang about them with designs upon the convoy. In regard to Tangier and Gibraltar, we may draw attention to the fact that the first was to be deliberately abandoned by the English within a very few years, while Gibraltar was to be acquired by conquest within a generation after our chaplain's diary was written. Head winds obliged the frigate to anchor in "Almarya Bay." Teonge goes in the boat with the captain to see the place, but the Spaniards refuse to let them land, supplying, however, "good wine, lemons, oringes, pomcytrons, sheepe, henns, eggs, cole-worts, excellent oyle, and salletts, cheape enough."

On September 21 he complains of "lamentable cold weather and a crosse wind; wee discover Mynorcha, or Minyorke. Wee keepe St. Thomas' fayre againe, for cloaths for the seamen." That same evening they anchor in Port Mahon, where a large fleet of vessels was very glad to see them, for they convoyed a store-ship with all manner of supplies from home. "The Prick Master came on board to muster us."

After describing their Christmas festivities, and especially and particularly what they ate and drank, Mr. Teonge goes on to say that, on Christmas night, "our honest Lieuetenant, Mr. Will: New, dyed, and left a mournfull ship's company behind him;" but, in the same paragraph, he says that the captain bought "3 Spanish hogges," and they all laughed to see how sick they were, "on acct: of the ruffnes of the weather," even in that landlocked port. The lieutenant was put into a coffin, and leave obtained from the Spanish authorities to bury him on "the small iland in the harbour which is given to the English to bury their dead uppon."

The chaplain records that he accompanied Captain Langston to inspect the celebrated fortifications, long afterwards rased, by treaty, and "they end the old yeare merily in wine, punch, and brandee."

A regatta was also held, in which "the Assistance barge outrowed the Royal Oake barge." Teonge hardly mentions any ship's boats but the barge and pinnace, but the launches of 1680 were very fine boats. They were beautifully shaped, like a small galley, carried a saker, on a carriage, at the bows, and sometimes pulled as many as forty oars.

The winter of 1678–79 appears to have been an exceptionally severe one in the Mediterranean, and the chaplain now begins to record constant funerals, and makes such entries as, "Prayers, no sermon for colde."

On January 10, 1679, "Our new Lieuetenant, Mr. Geo: Mountegue, son of Lord Mountegue, cam on board."

"A counsell of warr held on board the Plimmouth, our Admirall,

concerning some misdemeanurs in our Master, Mr. Henry Sturke, whoe was confined to his cabin ever since we cam from Cales, and was this day suspended from his place: and the next busines was concerning Sir Roger Strickland's removal into our ship, the Bristoll, in regard his owne ship, the Mary, is disabled to indure the sea."

Sir J. Narborough, in reporting the condition of his fleet at this time, is quoted, in Charnock, as saying of the "Mary," "Mary, Rear-Admirall, her head loose, complaints in her bow, and foul." She was a 60-gun ship, "and he being the Rear Admirall, may make a choyce of what ship he lyks best. And into what ship our Captaine is to goe is not yet concluded."

However, by January 14 it was determined (apparently by the "Council of War") that "our Captaine removes into the Royall Oake; a stately ship, of great force." The List gives the "Royal Oak" as of 1107 tons, 127 feet long, 40 feet 6 inches beam, 18 feet 8 inches draught, 470 men, and 74 guns, viz., 28 demi-cannon, 28 culverins, 16 light sakers, and 2 three-pounders.

On the 16th the formal exchange of ships took place,—"Capt: Killigrew out of the R[l] Oake into the Mary, to goe home; Sir R. Strickland into the Bristoll; and our Capt: Langston into the Royal Oake, a ship like him selfe. Now the flagg at the mizon top is hoysted on the Bristoll," and the three ships each fire twenty-one guns as the change is taking place.

The Captain Killigrew here mentioned was a most distinguished officer, rose to be admiral of the blue, and was, in 1693, joint commander of the grand fleet with Sir Cloudesley Shovell and Sir Ralph Delaval. Owing to a surprise of that fleet by the French, and the obtaining of a decided success against the English, the two last-named admirals were dismissed the service.

But to return to our chaplain. He had managed to be transferred to the "Royal Oak" with his friend, Captain Langston, and, on January 19, makes the following entry: "Prayers, no sermon. This being the first Sunday that our Captaine was on board the Royall Oake, our boatswayne made the ship woondrous fine, with a pendant at every yard arme, in all 25 pendants." "Mr. Twogood, our victualler," dies in Mahon about this time, and has a grand funeral. "8 trumpetts went first: the Chaplens went next by 2 and 2: next the corps borne by 6 seamen, the pawle being borne up by 10 Pursors: then the Captaines: next the Lieuetenants and Chyrurgions, 2 and 2." We see that our order is reversed, the seniors going first. At the water-side the procession was met by "our Admirall, Sir John Norbrough, and our Reare Admirall, and all the rest of the Commanderes in the Fleete: thence in a barge, all the other barges following, to the iland: . . . and every on returned to his owne ship soundly wett and colde."

January 23, "These 3 days wee are fitting out our ship, and bream-

ing her; with which Mr. Peyton was frighted out of his cabin." The breaming was a frequent necessity in those days, when docks were not convenient. "This night our Lieuetenant Mountegue made grande festo for all the Lieuetenants in oure State-roome: where our Captaine and two more Captaines were Lieuetenants for that night."

January 24, "This day cam in the Happy Return from England, Sir Will: Poole Commander, and with him the Noble Duke of Grafton, one of our King's naturall sonns by the Contesse of Castlemaine, a brisk young man, who coms to see the fashons." This "brisk young man" was intended for high place in the English navy, but was, unfortunately, killed, under Marlborough, at the siege of Cork, in 1690. The "Happy Return," which bore this royal scion, was a fourth-rate,—280 men, 54 guns.

"January 27" (still at Mahon), "This day an Irishman (whoe had beene master of a ship of 30 tunn, and was taken by the Argereenes, made his escape from Argeare, and cam to sea himself in a small boate, with a little rusks and water; and in 10 days time arrived heare, so weake that he could not stand at the first coming. T'was a strainge Providence!" especially as it was an unusually cold and stormy winter.

We see that the mortality among the crews was not confined to one vessel, for soon after Teonge is transferred to the "Royal Oak" we find such records as the following: "buried 2 out of our ship: John Parr and John Woolgar. I think they were little better than starved to death with cold weather."

"Collyer and Coolin went on shoare to fight, but were loath to hurt on the other, and so cam back, like 2 fools, well drunken."

Burials continue to be recorded almost daily, but Teonge mentions no epidemic; probably the crowded condition of the ship, the miserable food and clothing of the seamen of the period, and their filthy habits had much to do with the mortality.

Sham fights and boat exercises take place in the harbor, of which he says, "they turne for the advantage of the wind for at least an howre; at last the fight began very furiously: severall broadsyds passe, with musketts, blunderbushes, and petarreroes, and squibbs and crackers, like hand grenadoes. . . . At last the Duke takes the boats with his artilery and fyre-balls, and so the fight ends, . . . though the fight was only in gest, many of them were hurt by accident, and burnt with fyre-balls." The launches used on these occasions have already been described; Charnock gives an engraving of one, a beautiful boat. The pinnace was a stouter boat,—shorter, and of more beam, and used for ship's work.

On February 16, Sir John Narborough sailed for Algiers, leaving the "Royal Oak" and others in Mahon. The very next day important orders arrive, "expresse from England to Lyghorne in 16 days time, for Sir J's owne handes." The "James Galley" at once sails in pursuit with the despatches come by "lightning express."

In the mean time the weather continues very cold and stormy, and the "Royal Oak" always "preparing for sea," like some more modern men-of-war. Doleful entries continue to be made in the chaplain's log: "This day buried John Wilkinson, the Carpenter's Mate." "I buryed Izaac Maule, a Swede: and this day I buryed Samuell Massey."

On the 6th of March, having apparently been senior officer, or guard-ship, in Mahon, they sail for the westward, and now, for the first time, seem busied in quartering the men "in their severall stations, in case wee should meete with an enemy." There seems to have been no rule or regulation requiring the stationing of the men as the very first thing to be done. It seems to have been optional, from several passages in this Diary. "Buryed in the sea Will: Watson, Carpenter's crue," and that same time "a lusty ship coming up with us, gave us a sudden alarme: every on that could snatcht up a muskett. I went up on the top of the poope with my staffe gunn, and stood by our Lieuetenant Minck, who hayled the ship, and commanded them to come on board of us. They refusing, as wee thought, he bad me fyre at them, which I did: then they immediately loard their top sayle; but they making no haste to com on board us, our Captaine commanded to fyre a gunn from our Quarter Deck athwart their hawse. Then the Master came on board. She was a French vessell." . . .

Our parson seems to see no unfitness in his use of his "staffe gunn" on this occasion, but makes very merry in telling of a "Spanish fryar," who was a passenger, "whoe, having been drinking wine, was grone a little valiant, and he had got a muskett in his hand, and a coller of bandoleeres about him; and to see him stand in his white coate, ball'd pate, his muskett in his hand, and the 12 Apostles rattling about him, was a sight which caused much laughter."

After this little excitement they touched at "Finnisteara to cutt wood," an island which "had no inhabitants but Bandectoes, viz: such as are banisht from their naturall countreys for sum misdemeanours." Here they cut wood and shot goats, and then went over and anchored at Majorca, saluting the town with seven guns. "They answered not at all; at which our Captaine was very angry." But, next morning, "the Vice Roy (hearing how ill it was taken that they did not answer the King of Englands man of warr) commanded 4 gunns to be fyred: four —— had pleas'd us as well."

Here the captain fell sick, and grew worse by the time they reached Alicante Roads. On the 19th of March "brave Captaine Antony Langston dyed. . . . I stood by his bed syde when he breathed his last."

On the 20th, "about sun setting, wee went out about 2 leagues to sea, carrying our Captaine in our barge, and there put him overboard: for wee have no burying place on shoare. Wee were accompanyd by 8 more boats, and the merchants from the shoare." "Our ship fyred

40 gunns." After this funeral ceremony they all returned to the ship, and had "an excellent collation, and plenty of wine." The chaplain here inserts in his Diary a very creditable Latin epitaph to the captain, with a translation in English verse. He seems to have really regretted Captain Langston's death.

On the 22d of March the ship sailed from Alicante "for England, God willing. Wee have had a voyage of trouble. God send us well thither! I buryed Francis Forrest, as tis said eaten to death with lyce." "Our two Lieftenants and other officers take a noate of all Capt: Langston's things, and lock them all up." Precisely what would be done to-day.

Working to the westward they encounter very bad weather, during which they "splitt the fore and mayne topmasts. I buryed Isaac Webb out at the gunn-roome port." This seems to have been the usual place for burial at sea, instead of the gangway. The accident to the masts caused them to put in to Almeria, where "all our carpenters are at woorke at the masts" for several days. "At 12 this night we get up our maine top mast, and tis strainge to them that have never seen it, to consider how a peice of timber of that length and thickness (viz: 19 inches through) should be made to stand on the top of another peice, and to beare that stresse. The main mast is 32 yardes in length. The main top mast on the top of that is 21 yards and a foote. The top gallant above that is 8 yards and 1 foote, so that from the bottom to the top there is three score yards and five foote, besyds the flagg-staff, which at the least is 6 yards in length." As the "Royal Oak" left Almeria, they encountered the vice-admiral, coming in, in the "Rupert," "and now we have more alterrations and trouble. Captaine Rumcoyle was ordered out of the Phœnix into our ship, . . . Capt^ne^ Cloudesley Shovell out of the Seafar into the Phœnix, &c. &c," which would be tersely described by the modern naval officer as "immense amount of rot; got a new skipper." (Captain Roome Coyle was an officer of great merit, and was afterwards killed in command of the "Nonsuch," of 84 guns, in an action with two French vessels off Guernsey. The well-known Sir Cloudesley Shovell had been a lieutenant with Narborough, off Tripoli, during Teonge's cruise in the "Assistance," and had burnt a large portion of the Tripolitan fleet, by a boat expedition, returning without losing a man. His after-history is well known. When an admiral he was lost, with every soul on board his flag-ship, the "Association," on the Scilly Islands, October 22, 1707.)

"Past Maligo," on the 15th April, "our newe Captaine is woondrouse free, not only of his excellent wine, but also of his owne good companye amonge us; wee had a pigg to dinnar this day worth 8s. in England." Touching at Tangier and Cadiz, the "Royal Oak" encounters much bad weather, and the burials "out at the gunn room port" are constantly recorded. Yet no particular sickness is mentioned,

Perhaps typhoid pneumonia (?). The officers appear to have always been buried in a coffin. "God send us a short passage! Wee have little fresh water, and as little provisions for such a sick ship's company."

On May 13, "at 12, wee are in the King of England's dominions (Deo gratia), that is, past Cape Phinister, and entring on the Bay of Biscay. This day I was much abused in my cabin by Samuell Bayly, with base language. I may live to requite him on shoare. A brave gale to carry us over this dangerouse Bay, for which our noble Captaine keeps grande festo,"—in other words, the punch-bowl well filled.

"May 17th, a brave gale, but we are hindered by some heavy sayling merchants," of their convoy. (Serious complaints were made, about this time, of the neglect of convoying captains to take proper care of their charges, and lists were given of vessels captured by the Algerines, French, etc., through remissness in the men-of-war. The navy board made a long statement in reply. The whole may be found in Charnock.) "Wee call our men to quarters, and fyre 7 gunns to bring a French vessel under our stearne. She told us there was no war between us and France. She had neyther colours, nor so much as an ancient staff."

"May 21st, we made Land's End, and rejoice in boules of punch to see Old England once more, though wee have lost many men." After touching at Plymouth, Dover, and the Downs, each occasion being duly celebrated by salutes, and "boules of punch and brandy," "grande festo," at the latter place they "sent on shoare 32 sick men: pittifull creatures."

On the 31st of May "the Muster Master mustered us, and wanted above 60 men that were on the bookes; all dead at sea."

June 7, "The Prickmaster came to muster us, and found us defective."

Teonge also makes reference to the "damnable Popish plott," and on June 10 the captain, the chaplain, and the senior lieutenant went to Dover, "where wee take the oaths of allegiance and supremacy, and were nobly entertained by the victualler." "Wee had orders to com up to Sheernesse; heave short, ready to Sayle: but a fogg fell and stayed our passage."

They reached Sheerness on June 13, with "strange blowing weather for the time of yeare," and take out their guns and casks, and partially unrig the ship. "All mad to day. I went to Rochester, with our Lieuetenant and Pursor, and drink sack, &c."

June 23, "Wee leave our Ship at anchor at the Black Stakes, and are pay'd off for the Royall Oake: only my selfe and our Chyrurgion are demur'd for our groats and twopences."

"I sent my man with my goods to London in a hoy. . . . Safe home againe to Spernall. Deo gratias!"

E. SHIPPEN.

THE NAVY, AND HOW TO IMPROVE IT.

PART I.—"THE MATÉRIEL."

THE subject of the present condition of the navy is one which is and has been for some time past in the minds of all thinking officers, and which has been the occasion of many unofficial discussions among them. Much has already been written on the subject, but few have made any practical suggestion as to a definite plan of improvement. The *matériel* has been gradually disappearing from active service through various causes, and the navy of to-day, although not actually in a worse condition than that of five years ago, is infinitely worse when compared with that of other nations who have progressively improved and built up their *matériel* in accordance with new ideas and to meet modern requirements. There is no question about the fact that we must have a navy, and why, with the well-known talent and resources of our country, should it not be composed of as good, if not the best, ships afloat? We should now be able to decide upon the best type, although no one would advocate such a wholesale expenditure on ships and supplies as have England, France, or other European naval powers. But we should possess such ships that in case of war (which is not an impossibility) we should be able to save our ports from invasion and offer a warm reception to any fleet which might come to our shores with hostile intent, not to mention the matter of inspiring respect for our flag abroad during times of peace, and thus in all probabilities acting as a wholesome check upon the contemptuous inclinations of some nations.

It would be to but little purpose to survey the *matériel* of which our navy is now composed, as this has been frequently done, and never more effectually than in the "Harris bill," now pending in Congress. It can be summed up in a few words to the effect that for fighting purposes with modern war-vessels our navy is almost useless. We have a few wooden ships which would prove excellent adjuncts to a powerful navy, but which as main stays are but poor supports.

Our monitors are not only ridiculously light as ironclads, in view of the heavy ordnance now afloat, but are of such a type as to be unserviceable vessels with which to take the sea in times of peace, much less in times of war, when exposed to a powerful enemy. Our vessels are

all deficient in the indispensable requisite of speed, and aside from this, it is safe to say that out of the eighty wooden and thirty ironclad ships borne on the register of 1880, not half that number are now or ever could be made effective for cruising or fighting purposes. The conclusion drawn from this is that we have a quantity of worthless *matériel* which should be gotten rid of immediately and replaced by modern ships, and we must look to Congress for the necessary means.

There are some "far-sighted, broad-minded" politicians who see no use for a navy in times of peace, and no necessity for provisions for war. To this class of statesmen it is useless to explain, as they never have or never will see anything by argument, and, fortunately, their influence is of but little account at best. A second class do not care about the subject, and think it of no importance when compared with the carrying of "the district," and who think we could build a navy in three months any way. This class is almost as bad as the first, but as they err more from ignorance than design, they are open to conviction. A third class would like to have a good navy, but do not consider it indispensable, as they labor under the delusion that our government is always to remain at peace with the world, and they deceive themselves by the thought that saving the money which would be necessary to build ships is economy, never considering that should war come and find us in our present condition millions of money would have to be spent at once to make any kind of a defense possible, and then we would undoubtedly suffer not only by loss of property, but in our honor and reputation, which should be held above all other considerations.

A fourth and unfortunately small class recognize the great and vital importance of this question, and are striving to do what they can to bring about the desired result.

Upon the third and fourth classes we must depend for the necessary legislation, and upon the officers of the service for an intelligent and fair statement of the wants and requirements, and a fair showing what will be done with the money when appropriated.

This brings us to the discussion of the duties of officers in this respect. It is safe to say that if a construction fund were available to-day the Department would not be able to commence construction at once, as the question as to the type of vessels which would best meet the requirements of the service has not been decided. There is no doubt but that with our experience and the knowledge of the successes and failures of other nations we could soon design suitable ships, but this is a matter for grave consideration and discussion, and cannot be entered into too soon. Congress would be much more likely to appropriate a construction fund if the number, type, and probable cost of ships necessary were first decided upon.

The time now seems ripe for decided action. The *matériel* has reached such a state that there must come a reaction, and officers should

not only be prepared for it, but should do what lies in their power to hasten it.

The able bill introduced by Mr. Harris is still pending, and the fact that this has been most favorably received by the press shows that the people at large are not a little interested in the service. If a decided plan for the reconstruction of the navy could now be presented to the Naval Committee in Congress, it would do much to insure the passage of the Harris bill, and thus establish a new era in the service. For this reason, if for no other, officers should enter into free discussions, and opportunities be afforded for comparison of ideas, and thus much valuable information might be collected and compiled by a board officially constituted for this purpose. The Secretary of the Navy could form such a board under the title of "a board to discuss and decide upon the number and type of vessels, etc., requisite to place our navy on a proper footing." This board should be composed of officers of the best talent and most varied experience that the service affords. It should consist of line-officers, constructors, and engineers, and should be selected from the list of commanders and upwards.

On every station it might be made to the interest of all officers to discuss these subjects at special meetings, and submit the general result to the permanent board in Washington; or, if this were not found practicable, incentives might be offered for officers to submit their individual ideas. Of course there are many opinions as to the requirements of the navy, but few of these are the result of systematic study or consideration. The subject is one of such complexity that it requires thought, and the best way to induce officers to devote time and attention to it is to furnish each station with the necessary means, and to open free and general discussions. It is true that books on ordnance and ship-building are to be found in all naval libraries, but in these days of rapid stride in naval architecture and ordnance these books soon fall behind the times. If all the scientific and other journals bearing on naval subjects were sent to each station, officers could read them, become acquainted with the daily experiments and conclusions of various nations, and so keep thoroughly posted. Besides keeping them posted, this would induce a tendency to think on the subject and stimulate discussions, which could not but be conducive of good results.

The question of Armor *vs.* Ordnance having thus far been settled in favor of the latter, it is considered by many authorities that the day of the heavily-plated, cumbersome (not to mention expensive) ironclad is over; and whether this be so or not, it is neither necessary nor advisable to build such for our service.

It seems foolish, however, to say that because there are guns that can pierce any armor it is useless to protect ships by means of it. In the first place not more than three or four nations possess these heavy guns, and in the second place it is yet to be demonstrated whether or

not the monster vessels carrying these monster guns are a good class of ships to trust at sea. It is more than probable their sphere will be confined to home defense, or at best to European waters.

Under any circumstances it would seem very foolish not to protect our vessels from what they must expect ordinarily to encounter because they may encounter something they cannot stand against. It would be very much like a man's refusing ever to carry an umbrella because a heavy hail-storm might come along and destroy it.

Granting that the heaviest armor now afloat can be pierced, it becomes a matter of prime importance in the construction of men-of-war to so build them that they will float after having been pierced through and through by the projectiles of the enemy. With such a construction a vessel might dispense with armor *generally*, but have her vital parts protected by a sufficient thickness to keep out all but the heaviest classes of projectiles. At the same time it should be capable of carrying ordnance of such a calibre as would pierce anything likely to be met with, possess great speed, capable of rapid handling, built for ramming, and to carry and use the torpedoes considered most effective, viz., the spar, towing, and automatic.

It should be composite built (iron frames and wooden planking), and in compartments below, with a horizontal water-tight deck extending from the stem and stern (about midway between the water-line and keelson) as far amidships as the interior economy of the ship would permit. Small hatchways should be left in this deck at convenient places, so that access could be had to the skin of the ship. These hatchways would be kept habitually open, and closed only on probability of action. The object of this deck would be to prevent more than one-half of a compartment from filling at once. Should a hole be made through the side and above this deck, the upper half only would fill, and if below, the lower half, so that twice as many compartments could be pierced without danger of sinking as could be without the deck.

The vessel should have a *projecting casemated* battery amidships, the sides of the ship being hollowed out forward and abaft to allow of a direct fire ahead and astern from the broadside guns. There also should be a casemated battery in the bow to allow the mounting of one heavy gun forward.

In the midship battery should be mounted four 35-ton (or guns assimilating to this calibre) rifled breech-loaders, with a 50-ton gun in the bow, working on improved carriages. These ships should be single deck in the casemate, with a light spar-deck forward and abaft for convenience of quarters and working ship, they being full rigged to topgallant-sails.

The armor should be about eight inches of steel plating, put on at the water-line casemates and in-wake of machinery. The plating of the bow casemate might be reduced to four "or five" on account of

the angle of the bow. They should be fitted with twin-screws (so as to turn rapidly), and capable of making at least fifteen knots, and carrying ten days' coal.

The details of these vessels could be worked out, the general construction being as above described. They should be made as small as possible, compatible with the safe carrying of their armor and battery and to attain the necessary speed. Of this class our navy should have at least five, and in times of peace two or three of these could be commissioned as flag-ships on foreign stations.

As the type indicates, these ships would be for general purposes, and would take the brunt in all concerted actions.

Class II. should consist of fast unarmored cruisers. These should be of about two thousand tons displacement, composite built, with compartments and deck similar to Class I., full rigged to topgallant-sails, and capable of making at least fifteen knots. They should carry a battery of four 12-ton guns (our convertible 11-inch might be heavy enough for this class), with one 18-ton pivot-gun forward and another aft, these latter having a fire abeam and ahead and astern respectively. In addition to this battery they should have two or more long-range light rifles (60-pounder Parrotts, to be used for chasing blockade-runners, etc.). They should be built with a projecting ram with a metal shoe, so they could ram if occasion offered, and fully equipped with all torpedo appliances. To this class approach many of our present cruisers, but they are slow in speed, deficient in armament, and not built for ramming or firing directly ahead or astern, and as fast as possible they should be replaced by the above type. At least ten of this class should be added to our navy as soon as possible.

Class III. should consist of powerful rams mounting one heavy 35-ton gun in the bow, composite built in compartments, and plated the same as Class I., fitted with twin-screws, and capable of making fifteen knots, and fitted with the same torpedo appliances as Classes I. and II.

The ram proposed by Rear-Admiral Ammen seems to meet these requirements, and the "Alarm," now in commission, designed by Admiral Porter, will be a most efficient vessel of this type when the necessary speed has been obtained. As this class would not be cruisers, great sail-power or large coal capacity would not be necessary, fore-and-aft sails being alone sufficient. They would always be fought bows-on, their principal object being to ram.

This class should be kept in our home ports, so that they could easily be concentrated if necessary, and their function should be to run out and attack any fleet or vessel appearing off our ports with hostile intent. Of this class there should be at least twenty in the service.

Class IV. should consist entirely of torpedo-boats built to carry the spar-torpedo and possessing great speed. The "Lightning" and

"Spray" (Herreshoff boats), now at the Torpedo Station, are very good types of this class. These boats attain a speed of twenty knots, and possess the great requisite in a torpedo-boat of being able to stop from full speed in her own length, and very rapidly gather speed astern, which renders their retreat rapid after successfully exploding their torpedoes. Of this class we should have at least ten for harbor defense, so that they could in fair weather run out under cover of darkness and attack a blockading fleet. We should also have smaller ones to be carried on board of Classes I. and II., the former carrying two and the latter one, dispensing entirely with the service launch, which is too slow and unhandy for torpedo work, and although very convenient to have is not a necessity, and should not interfere with the carrying of regularly-built torpedo-boats. These four classes would furnish us with all the necessary *matériel*, and place our navy in such a position as to be able to engage any enemy with every prospect of success, and thus save the honor and wealth of the nation, which is undoubtedly seriously jeopardized by the present condition of naval affairs.

Such ships for the navy as have been briefly sketched in this article cannot be constructed in a month or a year, but must be gradually and systematically built, and an annual amount appropriated for their construction; knowing the number and type of vessels required, the amount necessary to build them can be easily calculated by experts.

Presuming that we build

Of Class	I. one per year, at	$2,000,000	. . .	$2,000,000
"	II. two " "	800,000	. . .	1,600,000
"	III. four " "	350,000	. . .	1,400,000
"	IV. five " "	15,000	. . .	75,000
	Total		. . .	$5,075,000

or, in round numbers, $5,000,000 per year should be appropriated for construction alone. This, of course, is a very rough estimate, and is inserted here simply to give some idea of the probable cost. By this system we would have in service in five years

5 first-class ironclads,
10 new swift heavily-armed cruisers,
20 swift heavily-armed plated rams,
25 torpedo-boats,

which, with our present *matériel*, would put us on a first-class footing, the expense being $25,000,000, every cent of which would be spent in our own country. Ship-building would receive an impetus, labor would be furnished to thousands of artisans, so that in addition to our having an effective navy great benefit would accrue, nearly all classes being represented in the construction and fitting out of ships. I mention this latter benefit merely to show that the money spent would do good in more than one way, and not as a reason why the ships

should be constructed. People are now resting confidently over our fancied security from complications with other nations, but complications will arise in the future as they have in the past, and it is our duty to be in some measure prepared for them.

The condition of the army and navy will have but little effect on the hot blood of our legislators when the national honor is at stake, so that now in times of peace we should prepare for war, or else make up our minds to take a back seat in the family of nations. We all know that our country is wonderful in resources, but ships will not grow, or guns and armor spring from mountain-sides. What any nation on the face of the earth can do in an emergency we can do, but we are not capable of impossibilities, and I contend it is an impossibility to construct a navy, such as is a necessity for our nation, in three months or three times three months. The amount of $25,000,000 may seem appalling to many, but when we know that England's ironclad fleet has cost her (up to 1874) $90,000,000, and her wooden fleet, from 1866 to 1874, $25,000,000 more, it does not seem appalling that we should expend $25,000,000, especially when we consider that we may possibly find ourselves opposed to England's fleet.

In these days of modern warfare wars are quickly decided, and great advantage rests with him who is always prepared, and consequently able to strike quick. Should war be suddenly precipitated upon us, millions upon millions would be wasted of necessity during the first part, and our loss, by want of having our ports properly defended, cannot be calculated. Twenty-five millions, however, would probably pay but a small portion of such loss, and we would find that our much-talked-of economy in naval affairs was but poor economy after all.

I do not wish to preach a "Battle of Dorking," but if our naval establishment is not placed on a better footing, some day we may find we are not as big as we look, and regret our parsimony when it is too late.

PART II.—"THE PERSONNEL."

Part I. of this article treats entirely of "the *matériel*," but no article on the navy would be complete without reference to the all-important part,—"the *personnel*." It is well known and recognized by all acquainted with our naval service that the officers have but few equals and no superiors as regards a thorough knowledge of their profession in all its branches.

Our school is the best in the world, and turns out excellent *matériel* for making officers.

At the time of graduation (six years from date of entry) a midshipman has had four years of excellent schooling and discipline and two

years' practical experience at sea, and is just at the point and in good condition to commence his career as an officer.

He is naturally zealous and at an age to take an interest in and learn quickly his profession, and the sooner he can be placed in positions of responsibility and treated as an officer the better it will be for himself and the service. As it is now, however, owing to the very slow promotion, he makes a full three-years' cruise as a midshipman, doing fo'k'sl, quarter-deck, boat, and other petty duties, and returns to be made an ensign and commissioned officer, but to find that he is not much better off as regards position than when he was a midshipman. He again goes to sea, as an ensign in the steerage, and seldom rises in the grade higher than an officer of the fo'k'sl. In this position he can expect to remain at least six years, when he will probably be promoted to a master, and then at the age (average) of thirty-one and after fifteen years in the service he will commence the duties of watch-officer, or, in other words, will begin to assume responsibility. He will be watch-officer both as master and lieutenant, and in from fifteen to twenty years he may be eligible for the position of navigator or executive officer of a third-rate, at an age of from forty-five to fifty years. These prospects are very discouraging to the young officer and are apt to disgust him with his duties. It is a matter of history as well as every-day experience that the most brilliant military men have been and are those who commanded young in life, and everything seems to point to the desirability of early bringing officers to assume responsibility and holding out to them hopes of advancement at some reasonable date. Officers kept in subordinate positions, with little or no responsibility on their shoulders and little hope for advancement until they grow gray with years, become timid, unreliant, and well-nigh unfit for military command. It certainly appears desirable that some plan should be devised by which this difficulty could be surmounted.

The only sure and regular outlet for the old officers is by retirement from the head of the list by reason of age or service; and even now there are strong efforts being made to increase the retiring age to sixty-five, thus stopping all retirements (and of course promotions dependent on them) for at least three years in order that the old officers may enjoy the benefit of the active list some time longer, to the utter discouragement of the younger ones. The advocates of the change argue that every one will in time be benefited by it, but in view of the slow rate of promotions now, another check will only aggravate the evil by more thoroughly disheartening the younger officers. The age for retiring (sixty-two years) now fixed by law seems to be fair and work well, and although it may be true that officers are as good at sixty-two as ever they were, the same will hold true at sixty-five, and on this ground the retiring age might be increased to seventy and then to seventy-five, and so on without limit. What is necessary for the good of the service is

to bring the younger officers to the head of the list at an earlier age than that at which they now arrive there, and anything tending to prevent this cannot but work injuriously. If an officer who has been from thirty-five to forty years in the service does not thoroughly know his profession he never will, and then he is at a more favorable age to take the highest duties and gravest responsibilities than he will be later in life, so that the argument that the officer at sixty-two leaves active service just when best fitted to continue is not a good one. His place is taken by a younger man of ample experience, and the influence of his retirement is felt throughout the service as each officer gets one number nearer the head of the list. Instead of increasing the retiring age to sixty-five, it would be much better to decrease it to sixty. It is not a question whether or not the retiring officer is still fit for active duty, but a question of whether the interests of the service are not best served by giving the younger officers an opportunity to rise and attain a position of rank before they are gray-headed.

Retirements, even under the present system, keep the officers too long in the junior grades, and allowing that the present age of sixty-two is the best age for compulsory retirement, it appears as if some law might be framed which would bring about the desired result without doing injustice to any one. There are many officers in the service who would embrace an opportunity to retire if they could do so with honor to themselves, and a law to allow them to retire on say half-pay after a certain number of years' service in a grade would meet the inclinations of such officers and work injury to no one. Of course the service in a grade which would entitle an officer to retire should be much less than the number of years it would require him to go through the grade, and taking into consideration the number of officers in the various grades, the following suggests itself as being a fair schedule:

	No. in Grade.					
Commodores	25,	allowed to retire after	3	years' service in that grade.		
Captains	50,	"	"	5	"	"
Commanders	90,	"	"	9	"	"
Lieutenant-commanders	80,	"	"	8	"	"
Lieutenants	280,	"	"	12	"	"

Officers so retired to constitute a reserved list, and to hold themselves amenable to orders in case of war. The half-pay would keep them in the service, and in case of necessity the country would have a reserved corps of trained officers to call upon.

Of course the President should have the power to retain officers (not over sixty-two) in active service at his discretion, so that in case of an officer's being particularly valuable to the service he might be retained, even should he desire to retire under the law. Compelling officers to retire after a certain number of years' non-employment (as

in the English service) would not be a good plan for our country, where political influence can have so much effect upon the employment and duties of officers.

Another matter which requires attention, and which can be easily rectified, is the facility with which officers in the higher grades are promoted. The examinations should be very rigid, going not so much into matters of detail as into the general record of the officers, moral and professional.

By a judicious use of its powers the examining board can do much to raise the general tone and efficiency of the service, and might weed the service of not a few notoriously unfit representatives.

The evils arising from the slow rate of promotion are aggravated by the manner in which the junior officers are detailed for duty and the kind of duty expected from them.

On one ship you will find ensigns (and even midshipmen) standing duty as watch-officers, while on another they will be doing the duty of forecastle officers. Some uniform system of detail should and could be easily adopted.

A midshipman, after final graduation, has at least three years to serve before becoming an ensign, and this is ample time for him to learn all the duties connected with the position. During these three years he should be employed as fo'k'sl officer and midshipman of the watch at sea, and as fo'k'sl officer, mates of the hull, holds, boat officers, etc., in port.

In addition to these duties he should be required to practice navigation, copy *one* watch, quarter, and station bill, and make himself thoroughly conversant with the manner of keeping the ship's log, by writing the columns of the log when on watch, and copying the deck-log for the first three months of the cruise. It is a waste of time to require him to copy the log-book for a whole cruise, besides tending to disgust him with his position.

When promoted to an ensign all these duties, except the practice of navigation, should cease, and the duties of watch-officer begin. His first cruise as an ensign should be aboard vessels of the first and second rate, and he should there have charge of the watch, under the supervision of the regular watch-officer, who would always be on hand to instruct him, and to take charge in cases of emergency, or when any important duty was to be executed. In this school he would thoroughly learn his duties, and be perfectly at home on deck before called upon to take independent charge. After the first cruise (or three years' sea service) ensigns should be ordered as watch-officers of the smaller vessels, and as mates of decks and assistant navigators of the larger ones, and in order to leave these positions open for them duties on shore should never be assigned to any below the grade of master. Ensigns and midshipmen, at the expiration of a cruise, should be

granted leave, or placed on waiting orders, for a reasonable time, and then ordered to sea.

This plan would give the junior officers greater opportunities than they now enjoy to learn their profession, and bring them much sooner to their legitimate duties. These measures would furnish some relief to the present state of affairs, and act as an encouragement to the young officers without in the least trespassing on the rights of the older ones.

Having briefly discussed the ships and officers of our navy, there remains a very important part, namely, the crews of our ships, and to them let us turn our attention. The practice of shipping men out of the United States is the most fruitful cause of our vessels being manned by a heterogeneous set who come into the service merely to get a living or escape from justice on shore, and have no other interest whatever in the service.

Naturally such men are difficult to handle or instruct, and no credit to the service at the best. Not being Americans by birth or education, they remain in the service as long as they consider it to their advantage to do so, and then have no hesitancy to desert if they cannot get away by any other means.

Were it not a matter of such importance it would become ludicrous to listen to muster and watch the men as they pass around the capstan of a ship which has been a year or so in commission on a foreign station. All accents are spoken and every nationality represented by the crew of a United States man-of-war.

It becomes very hard and discouraging work for the officers to discipline, drill, and instruct such a lot, and it reflects great credit upon them that the crews of our ships of war are so thoroughly disciplined and in such a state of efficiency.

No one outside of the service knows the constant troubles and annoyances to which officers are put by having to take charge and instruct a crew composed of a dozen or more nationalities (some of them not understanding English), and most of them very poor of their kind. The English or French know nothing of these difficulties. Doing duty on board their ships is child's play when compared to the duty required from our officers, and it is gratifying to know they always have been up to the requirements, and have by hard work always kept our crews up to those of any other nation in point of discipline and drills. Such a class of men, however, cannot be depended upon in case of war, and the sooner we improve our plan of enlistment the better.

The apprentice system if carried out to its legitimate end promises a relief from this difficulty, but I will have more to say of this anon.

The difficulty can in a great measure be obviated by shipping men for a longer term, and never (except under peculiar circumstances) shipping a man on a foreign station. As the law now stands men are shipped for three years. They are kept on receiving-ships until re-

quired for cruising vessels, and the consequence is that many come to vessels about to go in commission with two years and less to serve.

The ship goes to a foreign station for three years, and these men must be discharged when their terms of enlistment expire and sent to an Atlantic port at the government expense (unless the commanding officer retains them for sufficient reason with an increase of one-fourth their pay), and their places supplied by whatever material can be picked up. This necessitates constant changing in the crew, and the officers no sooner instruct the men of their divisions than many of them leave, and they have to take hold of the worthless material shipped to supply their places. This is not only discouraging but positively injurious to the service. Let the men be shipped for at least five years (the same as they now are in the army and marine corps), and then never send a man to cruise on a foreign station unless he has at least three years to serve. Those men who have less than three years to serve should be sent to vessels on the home station, where they could be discharged without expense to the government and their places supplied by additional drafts from the receiving-ships.

By this plan a large amount would be saved the government in the item of transportation and the crews would be kept together a whole cruise, thus avoiding the necessity of shipping men out of the United States. Better men would be attracted to the service if they knew they would not be associated with such "beach-combers" and bummers as now form a large element in our ships' crews. Our little navy of seven thousand five hundred men should be composed of the best material instead of what it is, and this could be almost entirely brought about,

1st. By enlisting men for five or more years.

2d. By prohibiting enlistments on foreign stations.

3d. Never allowing men to go to cruisers on foreign stations unless they have at least three years to serve.

These are simple but effective remedies which lie in the power of the Department to adopt, and require no acts of Congress.

The apprentice system, to which I have already referred, it is hoped will soon be in thorough working order throughout the service, and will of course do much to improve the tone and efficiency of our crews. It is greatly to be feared, however, that the boys belonging, as they do in many cases, to well-to-do, respectable families will be slow to re-enlist when once away from such a class as they now meet in the service as shipmates and companions, so that the sooner we improve the class of men shipped the better will it be for the apprentice system and service generally.

Boys are now shipped to serve as apprentices until they are twenty-one. They are first placed on training-ships, educated and trained efficiently for two or three years, and then sent to form a part of the

crew of a regular cruiser. Here they are mixed up with the crew in parts of the ship, divisions and messes, and are apt either to learn bad habits and vicious ways or else become disgusted with their surroundings. This cannot fail to do much to counteract the beneficial tendencies of the system, and should be obviated if possible. Certain ships of each squadron (best adapted for the purpose) should be selected and the boys sent to these only, and both they and the officers of the ship instructed that they are not sent in the capacity of full-fledged sailors but as apprentices, and these ships should be considered as part of the training system and officers selected for them with this point in view.

The boys should not be mixed with the crew, but stationed and messed together, with capable and experienced petty officers over them, so as to be kept as much as possible out of the influence of the bad characters of the ship.

Let them all be stationed in the mizzen-top and as light yardmen in the other tops, but not belonging to the fore- or main-top mess. They should not, as a rule, be allowed on shore with the "old salts," but sent by themselves, or else with reliable men.

Our apprentice system will amount to but little unless the boys can be induced to consider it to their advantage to continue in the service after they are twenty-one years of age.

Distinct modes of punishment should be prescribed for boys, as it does no possible good to punish them by placing them in irons or in solitary confinement. It is only the viciously inclined who will ever require severe punishment, and placing them in irons makes them feel like men, and is only a temporary inconvenience. When they are released they are not a whit better in behavior than before.

Boys are guilty of so many petty acts that are subversive of discipline that there seems no better way to correct them than by applying a little of the "oil of birch," or by "birching," as they term it in the English service. To prevent this punishment from being too freely administered it might be made one of the sentences to be awarded by a summary court in the cases of boys.

Again, when a boy shows himself to be lazy, sulky, disrespectful in manner, and not to be taking any interest in his duties, he should be court-martialed and dishonorably discharged, as the chances are that he will never amount to anything in the service, and his presence will only serve as a bad example and exercise an injurious effect upon all boys he may come in contact with.

If officers who read this do not agree with me in many respects, my object will be gained if I induce in them a thoughtful consideration of the points discussed, as I think our navy is now in such a condition that a long pull, a strong pull, and a pull all together will do much to place us on the footing we all desire.

A NAVAL OFFICER.

MILITARY COLONIZATION OF THE INDIANS.

HISTORY records that certain of the Pilgrim Fathers in their first exploring expedition "found a cellar carefully lined with bark and covered with a heap of sand, in which four bushels of seed-corn were well secured. After reasoning on the morality of the action they took as much of the corn as they could carry, intending, when they should find the owners, to repay them to their satisfaction." Proceeding farther in our investigation of colonial history, we find that when "Carver, Bradford, Winslow, and Standish embarked in a shallop and sailed around the bay in search of a settlement, they were saluted on their landing with a flight of Indian arrows, but that a discharge of musketry speedily dispersed the assailants."

These simple events epitomize our Indian history and policy of over two hundred years. Finding the seed-corn of the savages necessary to our use, we moralize over the act of appropriating it and take it. The aboriginal dissenting "with a flight of arrows" from our conception of his rights in the matter, we retort "by a discharge of musketry," which almost invariably terminates the discussion in our favor. Moreover, as a general rule, our moralizing follows the abstraction of the seed-corn, and our intention to repay the owners becomes the stronger as the chances of ever finding them becomes the weaker. Stealing and moralizing thus for over two centuries, and having gathered to ourselves nearly all of the seed-corn our red brothers possess, we find ourselves in this year of grace 1880 with a superabundance of seed-corn and a very uneasy conscience. The United States, a Dives plethoric with the riches of a copper-colored Lazarus, begins to have, now that there are no more of the latter's possessions to acquire, a certain uneasy feeling that possibly its business relations with Lazarus have not been entirely equitable. The remote progeny of the original Lazarus having been evicted from their once comfortable property and forced to reside in an alkaline and sage-brush tenement-house, the United States, quickened by the uneasy conscience above cited, regards these outcasts with as much sympathy as can be engendered without prejudice to the proprietary rights now vested in itself. Lazarus must remain, of course, in his tenement-house, but

Dives, anxious in a measure for Lazarus, but more particularly for the influence of Lazarus on his own moral atmosphere, is willing to at least have the tenement-house reasonably ventilated and provided with material fire-escapes and moral chloride of lime. To this end, therefore, has been invoked the assistance and advice of political plumbers, moral sanitarians, educational carpenters, and general philanthropical architects. A multitude of improvements have been suggested, a hundred and one plans have been tried. The tenement-house remains, as usual, an eyesore on the otherwise well-kept estate of Dives, unfit for occupancy,—a menace to the health of the surrounding farm-houses,—its occupants unruly and ungovernable, and a constant mortification to the now respectable Dives. What, therefore, must be done in the premises? Civilization is pressing in on all sides and making yearly new demands on the Indian for his hunting-grounds; demands which he is less inclined to grant as his experience of the results of prior concessions widens. The savage—still a savage—becomes more and more versed in the arts of war, and by his ability to arm himself, by his proximity to and better acquaintance with the methods of civilization, and by the alliances which he makes with his fellow-Indian, brought nearer to him by the pressure of surrounding settlements, becomes annually relatively more powerful and dangerous. Therefore, while the present system continues, we may look each year for wars which will greatly tax our military resources and result in needless waste of men and treasure. It is a self-evident fact that our Indian campaigns are becoming operations of more difficulty; not that our troops or officers are in any way inferior to those of twenty years ago, but because we have now to deal with a savage reinforced by all the appliances of civilization, and, as he is hemmed in by settlements, made stronger by the concentration of his powers. That they will be eventually subjugated is true, but we should view with apprehension this strategic advantage possessed by them. It may be urged that the Indian is unable to appreciate the advantage, or that tribal animosities will prevent the race from ever making common cause to utilize it. Let us not solace ourselves with that idea. Already tribes formerly hostile to each other have combined against the common foe, and as they shall begin to understand the value of union we may see the formation of confederacies capable of great offense. It is to be assumed that the object we have in view is to transform the present Indian country into an abode for civilized people. To do this requires that its present population must either change entirely their mode of life or be removed out of it. That means civilization or extermination.

The latter plan has been, as we have shown, the most in vogue heretofore. It has been, however, an expensive method, and its morality is one of grave doubt. The Indian naturally objects to it, and

formulates his objection in wars which shock the sense of the world. However regretable they may be, it is urged that they are inevitable; that it is useless to attempt to civilize the race, and that being then cumberers of the ground, intractable and irreconcilable, the only logical method to adopt is to exterminate them. "You cannot civilize them," is the word. Our reply is that the proper methods have never been taken. We have invariably attempted to appeal to a nature insensible to our mode of appeal; we have employed an argument beyond his comprehension; we have sought to work on a species of selfishness which does not exist. Let us look at this matter outside of sentiment and in the light of business. We have some scores of thousands of barbarians to civilize. Why not take them as barbarians, and found our civilization on the barbarian substratum? As the situation stands, we cannot expect to effect much by religious means,—you cannot work on sensations if they do not exist, nor address yourself to the cultivation of moral qualities the germs of which are buried in layers of ferocity and habit. Exceptional instances there may be of Indians who are Christians, or susceptible to religious influences, but the normal Indian is a fighter, a warrior, and we must recollect that he lives for war; that his occupation and source of greatest happiness is conflict with man or beast; and that the cardinal truth of religion is an absurdity to him. Equally absurd is it to endeavor to make a husbandman *de novo* of him. He despises all work as fit only for women. Come, then, let us take our animal as we find him! Work upon him with the tools nature designs. Commence with him as if we were rehearsing the history of our own race with him as the puppet. Nations never yet passed from barbarism to civilization by forced or unnatural processes. First it is a struggle for existence, then for individual supremacy, then for that of one body of men over the other, and that necessitates leadership, and thence results obedience, discipline, and law, accompanying which marches hand in hand a mental, physical, and material improvement, which has made the tattoed Pict the master of the world, and changed Cassivelaunus into Sir Philip Sidney and Boadicea into Mary Somerville. Let us therefore pursue an analogous course. We have the experience of others to refer to, to imitate, and to avoid. It was by availing itself of the characteristic qualities of its tributary nations that Rome extended her conquests. Her savages recruited her armies and were their own police. From her Numidian, Gallic, and Spanish colonies came her recruits, on whose discipline and instruction were laid the foundations of all after-structure of law and civilization. Among modern nations, England and Russia, the most uniformly successful in the conduct of the affairs of their uncivilized subjects, have shown us the methods. Let us utilize our Indian; and as we utilize him for our benefit we shall turn him into a useful being to his own advantage. As Russia gradually extends her frontier

the savages, "captives of her bow and spear," are incorporated in her armies, and from rude partisans gradually, by the operations of discipline, become effective soldiers, and, as the tide of conquest passes on, relapse into peaceful and industrious citizens. It is barely twoscore years since England's Sioux were the Sikhs, who now are among her best Indian troops,—unswerving in their allegiance, and in the dark days of the great mutiny "faithful among the faithless found." To come to the point without further illustration,—within all the territory now occupied by our troublesome wards let *military colonies* be organized, composed of the various bands of Indians. Abandon at once the civil administration of the race as something which not only has failed, but which will continue to fail, from its inherent weakness of possessing no power in itself to enforce its decrees. Turn the whole management of the wild Indians over to the army, not primarily on account of the purity of its administration, but because it is the power which saying this sees that it is done. Abandon the reservation system, as it now obtains, of the assemblage of large bodies of Indians in idleness. Let the central truth of the movement of reform be discipline and occupation, accommodating both to the natures and capacities of the subjects, and educating them to a condition for greater obedience and more useful employment. In the outset organize the different bands in some military order. Do not attempt too much at once, but take for the first subjects those most likely by their situation and the control we have over them to result in a success. Appoint the chiefs and principal warriors as officers and non-commissioned officers of the companies, and assemble the bands together as regiments, the superior officers of which must be officers of the army, fitted by their personal qualities and knowledge of the aboriginal idiosyncrasies to properly initiate and carry out the scheme and administer the affairs of this colony.

Among the many whose years have been passed in daily contact with the Indians we can certainly find men capable of assuming these posts, and of a quality of mind, heart, and courage to render them worthy successors of those Englishmen who redressed the injuries which had made the English rule in India a reproach, worthy compeers of Chinese Gordon. Pay to each Indian a certain regular stipend; it need not be much, but enough to impress upon him the idea that he is individually a part and parcel of the government. Issue to him clothing; furnish him with the badges of his rank; subject him to certain restraints of discipline, at first extremely light, but gradually increasing, until, as he becomes accustomed to it, he learns the great lesson of obedience to, and of the necessity of government. If this discipline is personal and not tribal, if the Indian is brought to understand, by a judicious system of rewards and punishments, that he individually controls his own destiny, a large item in the result sought for is obtained. It is to the destruction of the tribal idea and the cultiva-

tion of individuality that we must look for success. Where this plan of, in a measure, making a soldier of the Indian has been tried, it has, we believe, invariably been productive of good results. The savage, pleased with the distinction of rank, gratified with his temporary elevation, seeks as far as possible to become as much of a soldier as he can. He fails undoubtedly in appreciating the niceties and necessities of discipline and order, but the instinct is there, and it is in the cultivation of it that we must look for the base of any future edifice of order and obedience and culture.

The extension of the idea of this military colony is in this. The band is organized into something resembling a regiment. They are in a measure uniformed. They are disciplined to that extent that they recognize in their colonel and other white officers the source of authority, and see in them not only the representatives of the power which has enforced this organization, but the dispensers of rewards and punishments, the medium through which all their material advantages are to come.

In the beginning, and perhaps for some years, this regiment must retain a large element of the tribe in it. It must live in its village and must be accompanied by it. The squaws and papooses must of course be a concomitant. But still the elements of order may be yet engrafted on this apparently heterogeneous mass. The colonel having his regiment partially in hand finds himself in the hunting season. His family are restless; the savage instinct must have vent. Instead of sending out detached parties, let him move out by regiment, or by battalion, instilling gradually, as the summer hunting campaign progresses, and without unduly encroaching on the individuality of his people, ideas of discipline and its value. Let regular marches, order in camping, and so on, supersede the usual barbaric irregularity. Let him endeavor to inculcate habits of foresight in the collection and providence in the use of food. Let him exercise them in such military manœuvres as most nearly approach their own methods in war, but always with an increased tendency towards such as require combined action and necessitate a reference to and obedience for a central authority. If neighboring tribes are hostile or troublesome, he can utilize his command in their correction or pacification. His summer hunt or campaign can be by himself and officers profitably used in acquiring a knowledge of the country and its resources, and each colony be as it were the escort of a surveying-party.

As the season draws to a close let him bring in his colony to some point suitable for a winter camp, and there establish his village. Here traders may be permitted, under proper restrictions, to sell to the Indians such articles as they may require, and barter with them for the fruits of the chase. Stores and workshops may be built, means and implements for the erection of permanent quarters, at first for the more

prominent Indians, and gradually for all, should be provided, and citizen carpenters and other mechanics employed to superintend and instruct the members of the colony in the construction of them.

Let this village be planned with the well-understood intention that it is to be the permanent abode of these nomads, and they be encouraged and urged to erect buildings and look upon it as their home. Do not attempt to force them into civilization, but by affording them the means of attaining it, providing them with cattle, supplying them with seeds and simple implements of husbandry, and rewarding judiciously such as manifest an interest in their herds and fields, and purchasing of them their surplus, impress upon them the advantages which result from it. In the mean time practice regularly military manœuvres, and if it begins to be wearisome to some of the bolder spirits, send them off for a short winter hunt. Pursue a tentative course, and watch the development of this evolution from barbarism to civilization, carefully allaying the discontent of this by a wise change in occupation, and repressing the turbulence of that by a firm exercise of authority.

The following summer another hunting expedition, shorter than before, and then a longer winter stay, a greater attention to and enforcement of discipline, and more attention to manual labor. Step by step with all this let education, both mental and religious, be offered, encouraged, and enforced among the children. By degrees prohibit the young from accompanying their parents on their summer campaigns; reward and promote the diligent among them, and as the result of these measures, it does not seem rash to venture the prediction that a few years from the inception of the enterprise there will be seen instead of a band of lawless, restless savages, an association of men and women able to appreciate from the results of experience the advantages of discipline, the necessity of law, and the uses of labor.

Use this power thus gradually perfected as a menace to the lawless of other tribes. The Indian is naturally a warrior. Utilize his fighting qualities for the benefit of civilization. Then, as he begins to see that he is a factor in his own problem, finding that his natural tastes are not wholly curbed, but are wisely directed; that he does not forfeit his status as a warrior by knowing some of the arts of peace, he will gradually begin to appreciate the advantages presented to him. He will become a herdsman, a husbandman, and finally a mechanic, and all this by a process of natural transition in which his prejudices will not be shocked, and the cost of which will in the end be far less than that of the present method, which, resulting yearly in a waste of blood and treasure, accomplishes nothing and redounds to our national disgrace.

H. C. CUSHING,
Captain Fourth Artillery.

COOKE'S NAVAL ORDNANCE AND GUNNERY.[1]

A JUST estimate of the importance of this work in its relation to the requirements of the present day may be most readily arrived at by reference to progress in the past.

Material improvement in the construction of ordnance in the United States dates from about the year 1840, when a systematic course of investigation by officers of the Ordnance Corps was begun.

It embraced the nature of iron ore with reference to its treatment, the properties and qualities of cast iron and bronze, and the forms of guns. Mechanical tests of metals and comparative trials of pattern guns, cast at several of the best founderies in Europe and in this country, were made.

The only heavy gun which prior to that time could have been regarded as an American gun was the howitzer designed by Colonel Bomford, said to have been used in the war of 1812, which was longer in proportion to calibre than the celebrated 11-inch howitzers of General Villantroys, four of which were cast at Douai in 1804, two in 1811 and 1812, and one, of iron, at Liege, in 1813, for special purposes. A 12-inch columbiad, tested in 1846, at Boston, Massachusetts, gave with a charge of twenty-eight pounds and a shell weighing one hundred and eighty-one pounds a range of five thousand eight hundred yards. The determination by Major Wade, in 1843, of the "force with which fired gunpowder acts at different points along the bore of a cannon," by means of pistol-balls fired through tubes in the walls of a 3.5-pounder gun into a pendulum, an improvement of the method employed by Colonel Bomford in 1841, afforded the information required to give the gun a thickness proportional to the pressure of the gases at every point along the bore.

The first application of these results appears to have been made in the construction of the Dahlgren shell-gun, proposed in 1850, and cast in 1852, in which the thickness of that important part called the junc-

[1] A Text-Book of Naval Ordnance and Gunnery. Prepared for the use of the Cadet Midshipmen at the United States Naval Academy. By A. P. Cooke, Commander U.S.N. Second edition, revised and enlarged. (New York, John Wiley & Sons, 15 Astor Place, 1880.)

tion, 2.78 calibres in length, varies for a distance of 2.2 calibres in the same ratio as do the observed pressures, the chase being thinner than it would have been had direct proportion of thickness to pressure been continued beyond the junction; not thinner, however, as compared with the cylinder or "fort," than would be warranted by the consideration of Barlow's principle, and the fact that curvature of the exterior profile begins at a point some distance forward of that part of the bore which is subjected to the maximum pressure.

The 9-inch and 11-inch Dahlgren guns fulfilled the prediction made by their inventor to the Secretary of the Navy, in 1850, that he "could exercise a *greater* amount of *ordnance power with a given weight of metal*, and with more safety to those who manage the gun, than any other piece then known of *like weight*." Other experiments and investigations by Wade and Rodman, with the aid of specially devised apparatus, resulted in replacing the untrustworthy guns of large calibre, 8-inch and 10-inch, found to be deficient in thickness of breech, by others of great endurance; the proprietors of the founderies at which the experiments were made contributing by their practical knowledge and zealous co-operation to success. Finally, by his mode of hollow casting and cooling from the interior, Rodman constructed, in 1861, a 15-inch, and, in 1863, a 20-inch gun of cast iron.

Regarding the law of variation in pressure due to the ordinary cannon-powder as not satisfactorily established, the exterior model of the Rodman gun was determined on the hypothesis that the pressure is inversely as the square root of the space behind the shot. The gun was, however, made somewhat heavier in the chase than was due to this hypothesis, with a view to the employment of powder exerting a more uniform, and consequently a greater, pressure in the chase than ordinary cannon-powder.

In Europe, during the same period, but still continued, effort was directed to the improvement of rifled cannon. The result has been to demonstrate the superiority of the built-up breech-loading rifle to all other guns, and the necessity of remodeling the armament of the United States. The first steps are now being taken towards the construction of rifled guns that shall not be inferior to those of other powers.

Prepared for the use of the cadet midshipmen at the U. S. Naval Academy, and commensurate with the wants of the service, as expressed in the breadth of instruction at that institution, this volume contains carefully chosen and skillfully co-ordinated discussions of the results of investigation and experiment, embracing the most recently applied principles of construction and service of guns, with such references to the properties of matter and to mechanics as may enable the student to acquire a rational knowledge of the subject, and thus to be prepared not only to make efficient use of the formidable weapons already con-

structed, but to improve them,—to apply in the country in which they originated important principles heretofore left to be developed abroad.

Chapter I. treats of the ores of iron, their preparation for smelting, the blast-furnace, and chemical actions which occur in it; of the general composition of varieties of cast iron, the influence of silicon, manganese, and other metals; the cupola-furnace and processes by which crude is converted into malleable iron, with descriptions of machinery and the different modes of working iron, illustrated by suitable figures. A very full description of the different kinds of steel, processes of their manufacture and subsequent treatment, is given, with figures, including fine cuts of a Bessemer plant, from drawings furnished by the Bethlehem Iron Company. The chapter concludes with a comparison of the qualities of cast and wrought iron, steel, and bronze as cannon metals, the preference being given to low steel. Under the heading, "General Description of Ordnance," the following classification and nomenclature, the influence of form and relative dimensions of parts, as affecting the powers of resistance to the forces to be restrained, illustrated by the experiments of Wade, Rodman, and Noble, is discussed.

The guns in use in the United States navy—smooth-bores and rifles—are described, as are also the Gatling gun, the Lowell gun, the Hotchkiss revolving cannon, and the mortar. These descriptions are accompanied by carefully-drawn plans, in which the details of mechanism of the machine and breech-loading guns are clearly shown, and full instructions are given as to the proper mode of working these guns.

In "Theory of Gun Construction" are considered: the tangential and longitudinal strains, the strain due to compression, regarding the cylinder as composed of staves firmly secured at their ends, and subjected to pressure for different lengths, and its influence in connection with resistance to transverse and longitudinal rupture; expressions for the rupturing effort and resistances, the total bursting tendency, and, finally, the formula for the computation of exterior radii in determining the exterior model, employed by Rodman in constructing his 15-inch gun; the process of casting, including the precautions to be observed in preparing the stock for a blast of gun-iron, and the effects of different treatment; the law of molecular aggregation in passing from the liquid to the solid state, tending to produce planes of weakness, and all those effects which depend upon mass, form, temperature, and rate of cooling. Rodman's testing-machine for tensile, transverse, and torsional strains; indenting and crushing force, with the indicator, subsequently added; the fabrication of bronze howitzers for the navy, and of cast-steel boat-guns. Passing from cast guns to the principles of construction of built-up guns, the two general methods of equalizing the strains—by giving the exterior portions a certain *initial tension*, and by means of the system of *varying elasticity*, or by a combination of the two—are discussed. The advantages and defects of different

methods of application are impartially considered. The mode of converting cast-iron smooth-bores of the United States navy into muzzle- or breech-loading rifles, and the Parrott muzzle-loaders into breech-loaders, is followed by a clear and concise description of the Armstrong welded-coil system, as applied at Elswick and Woolwich; the Whitworth, Blakely, Vavasseur, and Krupp systems, and the construction of improved French rifled guns.

Considerable space is devoted to the different systems of rifling,—uniform and increasing twist, character of the grooves, their advantages and disadvantages,—the various methods of imparting rotation to projectiles, and, in connection with this subject, the relative advantages of muzzle-loaders and breech-loaders are considered. The recent development of the advantages to be derived from the employment of the air-space, with the fact that in properly-devised mechanism a better distribution of stress, if effected, determines that question in favor of the breech-loader.

The various projectiles, spherical and elongated, solid or hollow, with their respective coatings, rings, studs, and gas-checks, now employed, are described, and the influence of form upon velocity and penetration considered. The causes of deviation of spherical and elongated projectiles are set forth in connection with the tendency of the projectile to preserve the plane of rotation, illustrated by reference to experiments with a gyroscope, in which a small elongated projectile, substituted for the ring usually employed, free to rotate about horizontal and vertical axes, is subjected to a strong current of air,—an aid to conception employed by Sir William Armstrong in the earlier stages of his progress. The effects of impact, penetrative and concussive, direct and oblique, as affected by form, velocity, and nature of material, are discussed at length. Deductions from the results of experiment against armor wholly of wrought iron, or when faced with steel, with and without wooden backing, and a comparison of the racking and punching system, complete this section of the work.

Scarcely less important than the discussion of gun construction is that of the carriages which support them. Descriptions are given of carriages of the United States navy,—the Marsilly broadside, the muzzle-pivot, shifting-pivot, centre-pivot, and turret-carriages, with the various devices—compressors, hydraulic cylinders, etc.—to control recoil, accompanied by observations upon the mechanical principles involved, in connection with form and position; and, in addition, descriptions of English naval carriages. Scott's broadside carriage, in which resistance to recoil of the slide is afforded by a strong metal hook, and by grooves in coned training trucks, which bear upon circular metal rails on the deck, thus distributing the stress, which in some carriages is thrown upon a single pivot in the ship's side, an injury to which would disable the gun. The depression-carriages, which per-

mitting an elevation of twenty degrees, may be depressed to thirty degrees,—a most important improvement. The Moncrieff system of carriages, for heavy garrison guns, in which the force of recoil is, by means of a counterpoise, utilized to throw the gun down under cover, and to bring it, after loading, into the firing position. The English turret-carriage, with the various appliances for loading and working the guns, including the hydraulic systems. And, finally, the carriages of the 80-ton and of the 100-ton guns. In the latter, the simplest of all, the trunnions are fitted in heavy bronze slide-blocks, resting on girders, forming part of the turret, which are moved in or out by the direct action of two hydraulic rams, so modified as also to control the recoil.

Not less complete is the discussion of explosives, in which chemical reactions and explosive effect, as influenced by physical, mechanical, and external conditions and mode of firing, are considered. The propriety of the distinction to be drawn between explosive compounds—bodies composed of explosive molecules—and explosive mixtures, in which the separate ingredients have not explosive properties, is made apparent in connection with the relative susceptibility of different compounds to, practically, instantaneous explosion of the whole mass—detonation—and the phenomena attending its production by the action of one explosive upon another, analogous to induction of corresponding vibrations in one body by another, and as affected by mass. A knowledge indispensable to the safe employment of these energetic agents, which also finds application in the adaptation of fuses to different explosives.

The components and processes of manufacture of the compounds, nitro-glycerine, gun-cotton, the picrates and fulminates, and the preparations into which they enter, are given, with information as to their properties, uses, relative force, modes of firing, storing, and transportation.

Gunpowder, including special forms, mammoth, prismatic, perforated cake, and pebble powders, receives full consideration. The machinery employed in its manufacture is described and figured. And the most important conclusions arrived at by Captain Noble and Mr. Abel, from the results of their experiments on fired gunpowder, are given.

In connection with inspection and proof of powder are described the various instruments employed to determine the velocities of projectiles, in which pendulums, freely falling bodies, vibrating springs, or the flows of liquids serve as chronometers, and the instantaneous transmission of electric action, fixing instants of occurrence, determine intervals. Such are the following:

Navez-Leurs chronoscope, in which two similar pendulums—chronometer and register—having the same axis of suspension, their bobs

supported at the extremities of a graduated arc of one hundred and eighty degrees by electro-magnets, are successively released upon the rupture, by the projectile, of the conducting-wires of their respective magnets. An index-needle oscillating by frictional attachment with the chronometer pendulum, automatically clamped at the instant of passing to the graduated arc, affords the means of determining the interval. Here may be mentioned the remarkable application by Colonel Benton, in his velocimeter, of the principle "that the loosening effect of cutting a taut thread is transmitted to equal distances along the thread from the point of rupture in equal or sensibly equal times." This velocimeter operated by a single person, who may also fire the gun, gives results sufficiently accurate for all the practical purposes of proving powder and making ballistic calculations.

Le Boulenge's chronograph, in which two weights supported by electro-magnets fall successively. The first, a long cylindrical rod (chronometer), falls at the rupture of the first wire; the second (registrar) falls, at the rupture of the second wire, upon a trigger, releasing a spring-cutter, which indents the chronometer-rod. From the difference of the spaces described the interval of time is computed.

The Schultz chronograph, in which upon the lamp-smoked surface of a metal cylinder, having helical motion, a vibrating fork traces a time-scale. The rupture by a projectile of the primary wire of a Ruhmkorff coil, with an independent battery, induces in the secondary wire, one end of which is connected with the cylinder, the other carefully insulated, near it and just over the fork, a current; a spark projected to the surface of the cylinder leaves a bright spot at that point, indicating the instant of rupture. For the *Foucault* contact-breaker has been substituted, at West Point, with apparent advantage, *Russel's* electric interrupter, in which a simple spring makes the fork its own interrupter.

The Bashforth chronograph, in which, with the aid of a clock, a time-scale is traced upon a cylinder, rotating about a vertical axis, by a marker at end of a lever actuated by an electro-magnet and an opposing spring attached to a plate, having a nearly uniform motion of translation in a vertical plane parallel to the axis of the cylinder. The helical path described by the marker is interrupted at each second by a movement of the lever. A second lever and marker with electro-magnet and spring, also attached to the plate but connected with the screens, records the passage of the projectile. The markers being in close proximity the intervals are readily determined.

The Noble chronoscope, with which time records have been obtained for distances of 2.4 inches in the bore of a 10-inch gun, while the total time to reach the muzzle, a distance of one hundred inches, when fired with a full charge, is about the one-hundredth part of a second. In this instrument metal disks, covered on the edge with white paper

coated with lamp-black, rotating with high velocity, are connected with one end of the secondary wire of an induction coil, the other, carefully insulated, is brought to a discharger opposite the end of its corresponding disk, just clear of it. A spark perforates the paper at the instant of disruption of the primary wire, which, introduced by means of hollow steel plugs into holes bored through the walls of the gun, is severed by a cutter under pressure of the passing projectile. The angular velocity of the disks is determined by means of a stop-clock, which can be connected with the shaft. The linear velocity usually obtained is one thousand inches per second. By a vernier, reading to the one-thousandth part of an inch, intervals of time as minute as the one-millionth part of a second may be measured.

In the electric clepsydra, invented by Le Boulogné, the flow of mercury from a reservoir through a fine orifice, opened or closed by levers actuated by electro-magnets, upon the breaking of the electric current by the projectile, affords the means of determining the interval with great precision.

The various modifications of Rodman's pressure-gauge which have been made in this country and in England are described, including the double pressure-plug used in guns of 11-inch and higher calibres, with instructions as to their use and the application of results.

Under the heading "Pyrotechny," defined as "the art of preparing ammunition and fire-works for military and ornamental purposes," are described: The arrangement of laboratories, the precautions to be observed, materials employed, compositions and fabrication of primers, fuses, rockets, signal-lights, etc.

The important subject of fuses is carefully treated. The most highly esteemed, time and percussion, fuses, as well as those ignitors and exploders which depend upon electric agencies for their action, are described in detail.

Under "Practice of Gunnery," the service of ordnance, including the fitting of sights, determination of distances, electric firing, the different kinds of fire, direct, ricochet, etc., with descriptions of gun implements.

Investigation of the motion of projectiles, by Professor I. M. Rice, U. S. Navy, in a non-resisting medium, and also in air; the latter investigation, with some changes in the rotation, substantially that of Professor Bashforth. Accompanying tables, reprinted from his treatise, afford the means of finding, approximately, the trajectory of a projectile, and its time of flight. Examples of the use of these tables are given.

The twelfth and concluding chapter treats of the "Operations of the Naval Brigade": Landing—On the March—Engaging—Field Fortification—The Retreat.

JOHN M. BROOKE.

EDITORIAL NOTES.

THE disastrous defeat of General Burrows's brigade by an Afghan force under Ayoob Khan puts out the one spark of satisfaction that has relieved the gloomy aspect of the British invasion of Afghanistan. Hitherto those who have sought to extract comfort from the meagre showing of results that the policy of the government in Afghan affairs has afforded, have found it in the generally good leadership and judicious handling of troops which have marked the conduct of military operations. More than one comparatively unknown general has in the Afghan war proven his aptitude for command, and for the most part the rank and file, both English and native, have met the requirements of their arduous campaigning in a way that was worthy the traditional renown of British soldiers. To be sure, this was scant solace to the tax-paying citizen to offset the fifteen millions sterling that the war has cost, and the utter absence of any appreciable political result, but it was something. It flattered his pride if it did seem dearly bought. Now, however, all this is changed. A brigade of British troops has been not only beaten, but wellnigh destroyed by an Afghan force, and the details of the affair, so far as we are in possession of them, seem to indicate both bad judgment on the part of the commander and faulty behavior by at least a portion of the troops. This disaster will increase the embarrassment of the British government respecting its Afghan policy. Of course the first step will be the forwarding of reinforcements, but then will come the question whether these shall be used to cover the withdrawal of the troops, which had been determined on before this unfortunate affair, or whether British honor imperatively demands that the evacuation shall be suspended until satisfaction be obtained for this humiliating defeat. Our own impression is that, hard as it may be, the government will swallow its pride and go on with the evacuation. The Afghan invasion has been an ill-starred venture from the first. It was undertaken against the advice and with the protest of nearly every statesman whose knowledge and experience made him competent to advise, and almost every prognostication of evil made by such men has been signally verified. As a bulwark against a Russian advance upon India, Afghanistan left to itself will prove more effective than if occupied by British troops, for

so intense is Afghan jealousy of foreign influence that no convention between Russia and the Ameer can prevent the wild hordes that inhabit the country from opposing a Russian advance through their territories, and so proving the best possible protection that England could have against the invasion of her Indian possessions.

NOTWITHSTANDING the apparent activity that the warring Republics of South America continue to exhibit, there is a prospect that by dint of sheer exhaustion of men and means their wearisome struggle must soon come to an end. A recent correspondent of the *British Army and Navy Gazette* writes of them thus: "I have just returned from Chili, and was at the seat of war a few weeks before I left, and it is patent to all out there that the trio of insolvent belligerents are entirely exhausted. They have neither money nor men to carry on the war; the Chilians often have only a few days' provisions for the badly-clad, done-up soldiers, who have not had any pay for upwards of a year, and scarcely sufficient ammunition, and that within a very few days' march of the enemy, who, in his turn, is too exhausted and unprovided to move and drive them back. Hence all the marching, countermarching, and halting, so unintelligible. All three are borrowing money at immense sacrifice, hoping to pay by and by from money borrowed on easier terms in Europe! It is time that the European powers interfered, and put a stop to such utter and useless waste of life and property, for, though there is not much bloodshed, sickness and privations carry away their hundreds monthly."

No sign of the times promises better for the development of our military efficiency than the growth of good feeling between the Regular Army and the Militia of the States, which daily becomes manifest. This state of feeling is primarily the outgrowth of the war, but it has been wisely fostered by officers, both of the Army and National Guard. It has just received fresh impetus from the action of Adjutant-General Drum, in acceding to the request of the adjutant-generals of certain of the States to furnish them with copies of the general orders of the War Department. General Drum has also received and granted an application from the Adjutant-General of Connecticut for the detail of an officer of the Regular Army to inspect the troops of that State.

This latter step has a precedent in the case of Massachusetts, which State last year sought and obtained the services of an inspector of the Regular Army to make inspection of its volunteer militia during their season of encampment in September and October. Both the distribution of the orders of the War Department to the militia, and an annual

inspection of the militia by officers of the Regular Army, will doubtless become general, and both practices are well calculated not only to promote good feeling between the two branches of the service, but also to vastly improve the tone and efficiency of our military arm. The time has gone by for treating the Regular Army and the Militia as separate and distinct bodies, having no mutual relation. They are parts of one whole, and together represent the defensive arm of the country as against invasion from without and the support of law and order when threatened by disturbers from within.

An item floating through the English professional journals gives the naval expenditure of the chief maritime nations as follows:

England, $52,434,545; France, $36,264,195; United States, $23,500,000; Russia, $17,796,840; Germany, $11,434,195; Italy, $8,864,875; Austria, $4,226,320. The English expenditure is about one-third higher than that of France, and more than double that of any other power. But the object supposed to be insured by it differs considerably in the several countries. If a chief object of keeping up a naval force be the protection of maritime commerce, we should find that to protect every one hundred tons of merchant shipping sailing under the national flag costs annually—in France, $3890; Russia, $2870; Austria, $1380; Germany, $1070; Italy, $935; United States, $875; England, $575. The annual sum necessary to keep up on their present scale every ton of armored and unarmored fighting shipping in the sea-going squadrons, and to maintain the reserves and establishments, as well as the *personnel* required by it, deduced from the total expenditure, is, in the United States, $600; in Russia, nearly $500; in France, $260; in Germany, $250; in England, $215; in Italy, $200; in Austria, $150. It should be observed that the two nations whose expenditure per ton is less than that of England, Italy and Austria, do not maintain sea-going squadrons on stations at a distance from home; all the others do. As the cost of the *personnel* enters into the above proportion, it naturally follows that in navies recruited by voluntary enrollment the sum is higher than it would be were compulsory service in force. Thus, in Russia, where the cost per ton is much above that in all other European countries, the average share of each member of the *personnel* in the total expenditure—$425—is the lowest. Even here that of England—$900—is exceeded by that of the United States, France, and Germany.

SERVICE LITERATURE.

THE preparation of their "Naval Encyclopædia" is being pushed by Messrs. L. R. Hamersly & Co. with the utmost degree of diligence consistent with a proper regard to thoroughness and accuracy. They will not probably be able to have it finished by September, as they had hoped, but confidently expect to have it in the hands of subscribers by the 1st of November. Officers of high rank in the navy who have examined advance-sheets of the work have expressed themselves as greatly gratified with its character, and have predicted for it a very extensive sale not only in the service, but in other quarters, where the mass of varied information contained in the book will render it valuable, not to say indispensable. Among the most eminent of the contributors may be mentioned Captain S. B. Luce, on Anchoring, Mooring and Unmooring, Organization, Naval Administration, Naval Tactics, Board of Admiralty, and Naval Songs; Captain G. E. Belknap, Deep-Sea Sounding; A. B. Johnson, Light-House Board, and Light-Houses; Medical Director Joseph Wilson, Naval Hygiene, and Mechanical Ventilation; Lieutenant-Commander F. E. Chadwick, The Coast-Guard of England, and The English Naval Reserve; Prof. J. R. Soley, International Law; Commodore E. Simpson, Armor, and Ironclads; Lieutenant-Commander J. E. Noell, The Log, and The Lead; Lieutenant-Commander Nelson, Laws of Storms; Lieutenant-Commander F. M. Green, Navigation; Lieutenant H. T. Stockton, Naval Establishments of Great Britain; D. P. Todd, Astronomical Ephemeris; Prof. W. N. Hill, Explosives; J. E. Dulin, Boards of Examination for Promotion and Retirement; Medical Director E. Shippen, Exmouth, Forbin, Kane, La Perouse, La Vallette, L'Isle, Ruyter, Sick Bay, Ship Fever, Von Trump, Loyall Farragut, and Admiral D. G. Farragut; Lieutenant F. S. Bassett, Fire-Ships and Rafts, Exploring Expeditions, Gulfs, Oceans, etc.; Dr. John T. Carpenter, President Pennsylvania State Medical Association, and formerly of the United States army, Hospital Gangrene, Scurvy, and Gunshot Wounds; General Paul A. Oliver, Gunpowder; Lieutenant H. W. Lyon, Casting of Heavy Guns; Captain S. R. Franklin, Hydrographer, and Hydrographic Office; Lieutenant W. M. Wood, Life-Boats, and Boat-Detaching Apparatus; Lieutenant W. W. Kimball, Machine Guns, and Magazine Guns; Chief Engineer A. Aston, Marine Steam-Boilers, and Marine Steam-Engines; Rear-Admiral Ammen, Marine Rams, and Interoceanic Canals; Lieutenant T. B. M. Mason, Naval Brigade, and Diving; J. E. Dow, Navy Department, and Volunteer Navy of the United States; Rear-Admiral Emmons, United States Navy 1775 to 1812; Rear-Admiral Stevens, United States Navy 1812 to 1880; Prof. John M. Brooke, Ordnance; Lieutenant E. T. Strong, Preparing for Sea, Rope, and Rope-Walks; Chief Engineer J. W. King, Paddle-Wheels; Captain J. H. Merryman, United States Revenue Marine; Commander H. Glass, Nautical School-Ships; Naval Constructor S. H. Pook, Ship-building; Lieutenant Colvocoresses, Pen and Ink Sketching, and Charts; Lieutenant R. M. G. Brown, Submarine Mines, Torpedoes, Torpedo-Boat, and Torpedo Station; Rear-Admiral Preble, Naval Salutes, Frigate, and Naval Uniforms; Surgeon J. H. Kidder, Dry Rot, and Yellow Fever. The following extract from the table of contents of the book will give an idea of its importance and value: "I. A complete Dictionary of Nautical Terms and Phrases. II. Biographical Notices of Distinguished Naval Officers of our own and foreign services. III. Special Articles (including in their scope the entire range of Modern Naval Science, prepared expressly for this work by officers and others of recognized ability in their respective fields of discussion, and comprehending the freshest and most authentic information attainable respecting the several subjects treated). IV. A Gazetteer of the Principal Naval Stations and Seaports of the World. V. A Supplement containing concise Records of Living Officers of the Navy, including Captains, Commanders, Lieutenant-Commanders, and Lieutenants and Staff-Officers of relative rank. (The records of flag-officers will be included in the body of the work.)" The book will be handsomely and strongly bound in library sheep, and sold only by subscription at the uniform price of $10 per copy, postage paid.